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Comments of the

Environmental Defense Fund

on the

Draft Programmatic Environmental Impact Statement/Environmental Impact Report

CALFED Bay-Delta Program

June 1999

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SUMMARY

The June 1999 CALFED Bay-Delta Program Draft Programmatic Environmental Impact Statement/Environmental Impact Report is a flawed document describing a flawed and incomplete plan. It is possible for an objective reader to conclude from the June 1999 Draft that CALFED is intent upon building a Peripheral Canal and upon setting up the basis for the construction of a large number of new surface storage projects in the state. The program also leaves so many questions unanswered – including questions it explicitly posed to itself as recently as in its December 1998 plan – that it can not be viewed as giving readers fair notice of what CALFED's programmatic intentions actually entail.

This is not to say, however, that the June 1999 Revised Draft is without merit. Considerable progress has been made in the five years since CALFED began operations. CALFED has, in conjunction with pre-existing programs set up by the Central Valley Project Improvement Act, begun to define and embark upon an ambitious ecosystem repair program that could ultimately provide the long-term stability for California's water resource allocation system that all parties seek. CALFED has been less successful, however, in refocusing its member agencies on a contemporary water management strategy that departs from the past's emphasis on building water projects – dams and canals – which have caused so many of the environmental problems that CALFED is now being asked to remedy. Such a new system would borrow a page from California's energy history. Stop building publicly-subsidized, oversized, mega-projects based on inflated forecasts of demand and incomplete integration of financial and environmental costs; and rely instead on a flexible, dynamic, and cost-effective allocation system that would make better use of the state's massive existing water infrastructure by means of a water transfer

market as well as investments in conservation and efficiency. Note that we have attached the 11/5/98 "Blueprint for an Environmentally and Economically Sound CALFED Water Supply Reliability Program," written by numerous environmental organizations, that addresses how CALFED could develop a comprehensive plan to restore the ecological health and improve water management in the San Francisco Bay-Delta.
(See Appendix A.)

CALFED is still a work in progress. The June 1999 Draft provides much useful information, and the implementation of the program it envisions for the next seven years can provide a valuable forum for all parties to continue working towards ecosystem repair, water quality improvements, and development of the tools that will be required to move California's water management system into a less contentious future. Much of CALFED's planning, however, is incomplete. The fundamental factual foundation – such as who gets how much water now and how much is "needed" for the state's various competing uses – is not described and is still a matter of intense controversy in other forums. Fundamental tools that are essential prerequisites to the implementation of the CALFED program, such as clear rules for water purchases and transfers, have not been created. Moreover, the latest CALFED innovation – the "Environmental Water Account" – which could turn out to be a useful tool for minimizing conflicts over water allocation, is still defined only in the loosest terms. CALFED's other most heralded recent initiative – the Integrated Storage Investigation is similarly incomplete in both its intentions and its methodology.

The incomplete nature of the present CALFED document, combined with its continually moving planning process, means that the present review process can hardly fulfill the NEPA/CEQA requirements of releasing a draft PEIS/EIR for public review. Once CALFED has actually determined what its Record of Decision will be, it should release a draft ROD PEIS/EIR so that interested parties may review and comment upon CALFED's actual plan, as well as a complete analysis thereof, before CALFED enters a final ROD.

As a result, EDF's detailed comments, which follow this summary, are themselves necessarily incomplete. We simply highlight some of our particular concerns:

1. **CALFED must double its efforts to facilitate and improve water transfers, which represent both an affordable and environmentally friendly means of meeting California's water needs.**
2. **In order to achieve CALFED's restoration goals, environmental water acquisitions (and environmental water appropriations) must be prioritized to meet restoration needs and must be protected from unauthorized diversions.**
3. **The Environmental Defense Fund supports the Environmental Water Account concept as specified by CALFED: "The EWA would provide fisheries benefits above and beyond the existing 1994 bay-Delta Accord, CVPIA, 1995 Water Quality Control Plan, and ESA biological opinions without adding new regulatory requirements."**
4. **CALFED should acknowledge the substantial private benefits that "ecosystem restoration" dollars have and will continue to provide.**
5. **The decline of the Bay-Delta ecosystem and its native species has been caused primarily by the extraction of water from the system. No additional water should be taken out of the Bay-Delta system for consumptive use until it can be demonstrated that CALFED's ecosystem repair program has significantly improved the ecological health of the Bay-Delta system, and that doing so will not jeopardize further a sustained ecosystem recovery.**
6. **The Revised Draft fails to specify the legal, financial, operational, and hydrologic baselines that are a critical part of the foundation of any durable long-term program.**
7. **CALFED should select its water management plan on the basis of sound economics and explicit financial criteria.**
8. **CALFED needs to approach a new water management scheme without new surface storage, which has not only devastated the Bay-Delta in the past but is not cost-effective for the future.**
9. **EDF opposes the Hood diversion, which the June 1999 Revised Draft appears to authorize, because the diversion is very likely to have devastating impacts on salmon species. CALFED should analyze other feasible methods to improve water quality for urban users.**
10. **Effective ecosystem restoration is the most significant ESA assurance that can be provided to water users. Although mechanisms such as the Environmental Water Account can be used as a first resort to respond to the needs of listed species, "reinitiation of consultation" (and the potential additional water supply restrictions that may result) must remain as the final resort.**

DETAILED COMMENTS

1. CALFED must double its efforts to facilitate and improve water transfers, which represent both an affordable and environmentally friendly means of meeting California's water needs.

From the beginning of the CALFED process, nearly five years ago, EDF has been asking CALFED what it will do to help facilitate water transfers in this state. Water transfers are an affordable, implementable, and flexible means for addressing the alleged mismatch between water supply and water demand. Not only are water transfers one of the most affordable means of meeting water needs, they are also consistent with the CALFED principle of avoiding redirected impacts. Experience has shown that diversions out of the Bay-Delta watershed will negatively impact the Bay-Delta ecosystem, and building additional storage to increase water supplies will inevitably increase diversions from the system. Water transfers, done in conjunction with water conservation, represent the best solution for meeting this state's growing water needs without promoting increased diversions and further damage to the environment.[1]

Considering the importance of water transfers for both preserving the environment and improving water supply reliability, the CALFED document describing the Water Transfer Program Plan shows that CALFED has made surprisingly little progress in facilitating water transfers. For all of the major policy issues that must be resolved to help develop an active water market, CALFED has done little more than state that a process will be convened among all interested parties to find a solution. It is time for CALFED to double its efforts at defining both administrative and legislative solutions to water transfer problems as a cornerstone of the final CALFED Record of Decision. Important water transfer issues that should be resolved by CALFED include:

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[1] Water transfers – which generally comply with the CALFED principle of "users pay" – would obviously receive significant support from CALFED if the prospect of further public subsidies for water development efforts was firmly put to rest. So long as water users believe that they might receive "free" water from the state and federal governments, water users will make little effort to redistribute supplies amongst themselves.

- ***Instream Transfers***

  CALFED has made clear that much, if not all, of the water needed to meet the ERP goals will come through environmental water acquisitions. Those acquisitions will presumably be made with money that is earmarked for environmental restoration. Under present law, at least as interpreted by the State of California, the Bay-Delta exporters may essentially divert environmental water acquisitions from the Delta so long as Delta outflow requirements are being met. If CALFED wishes to meet its ERP goals for delta outflow, CALFED must adopt a policy, to be implemented by DWR, USBR, and SWRCB, that mandates that environmental water acquisitions remain in the stream even if in excess of regulatory requirements. The policy should be extended to non-governmental environmental water acquisitions as well. Just as the exporting parties have received the protection of Term 91 for *their* water, so should the environment receive protection for *its* water.

- **Removing the district middlemen**

  An active water market requires that a host of sellers be available for interested buyers. California water law currently gives a number of water districts the authority to stop water sales by their member farms, drastically reducing the number of available willing sellers. CALFED must see to it that the parties in California who actually use water are permitted to sell conserved water without interference from their water districts. Such a system would place the incentive to sell water (extra compensation) and the authority to sell water in the same party, the farmer. Water districts should, of course, be compensated for additional costs caused by such transfers, but they should not be permitted to veto such transfers.

- **Water Metering**

  Integrated and effective water management, and water markets, can only occur if the quantities of water used by the state's water users are actually known. Consequently, CALFED should require that all surface water diversions and groundwater extractions

be metered and reported. To spend billions of dollars responding to a "supply shortfall" without a proper accounting of where present supplies are being utilized is, to say the least, grossly irresponsible. As with groundwater management, metering will also help to facilitate groundwater banking programs.

- **Transfers of Stored Water**

  As riparian science is just beginning to understand, rivers not only need sustained minimum flows to protect the ecosystem, but they also need pulse flow periods that mimic natural river processes. Transfers of stored water, which inevitably lead to reservoir refill, will reduce pulse flows in streams that are an essential part of a river's health. Any reservoir refill criteria adopted by CALFED should go beyond simply protecting other users of water and should aggressively protect natural processes. A party transferring stored water (water for which the party has no record of historical beneficial use) should only be able to refill their reservoir during pulse flows that occur during true flood events – when there is a need to hold water back in reservoirs for the safety of downstream residents. All other flows in excess of regulatory requirements should be presumed to benefit the natural environment and should not be subject to capture and sale.

- **Groundwater Management**

  As we have been stating for years, the significant interrelationships between surface water and groundwater resources must be recognized by California's water rights system. As a starting principle, a transfer of water should not increase the amount of water that a party is entitled to use, whether it be surface water or groundwater. Accordingly, CALFED should prohibit any groundwater substitution of transferred water, except, of course, for the use of groundwater that has been stored as part of an affirmative groundwater banking program. Likewise, CALFED should prohibit the transfer of water that would otherwise percolate to usable groundwater basins.

Groundwater management will not only facilitate transfers, but will also help to facilitate groundwater banking programs.

- **Third Party Impacts**

  We agree with CALFED's assessment that third party impacts should be avoided and/or mitigated. While we believe that there are many third party impacts that should be addressed by CALFED, we request that CALFED focus at least part of its efforts on the protection of low-income farm workers, who have had little voice in the CALFED process to date and who, consequently, are at risk of receiving few protections. Because determining exactly who has been impacted by a water transfer can be difficult, we believe that a fee should be imposed on all water users, as well as on individual transfers, and that the money so generated should be used to foster a combination of local economic development and relocation and retraining assistance. Decisions on the use of such funds should be made both by the local government and representatives of the farm worker community.

2. **In order to achieve CALFED's restoration goals, environmental water acquisitions (and environmental water appropriations) must be prioritized to meet restoration needs and must be protected from unauthorized diversions.**

As noted in our discussion of transfers, CALFED has identified environmental water acquisitions as a central tool for achieving the goals of the ERP as well as the MSCS. Understanding that the scope of CALFED's environmental water acquisition program is just now taking shape, EDF would like to make the following comments and recommendations on how the environmental water acquisition program should be structured:

- The environmental water acquisition program should insist that environmental acquisitions do not result in any water users increasing their diversions (unless, of course, a downstream party is willing to pay fair value for the water and that payment

can be reinvested to provide even greater environmental benefits). Consistent with the principle that environmental water acquisitions should supplement existing regulatory requirements (unless they are purchased by a party to meet their own flow obligation), under no circumstances should environmental funds be used to provide the carriage water requirements for consumptive water purchases.

- Environmental water acquisitions funded with restoration dollars should not be used to provide environmental mitigation for new water development projects.
- An effective water acquisition program is dependent upon a secure funding source. Not only are sufficient funding sources required, but CALFED must seek to develop ways to hold appropriated sums in reserve for use during periods of increased environmental water needs, such as during a drought.
- Priorities should be placed on permanent water acquisitions.
- Environmental water acquisitions should be prioritized and implemented based upon the best available science.
- The CALFED acquisition program should be coordinated with the developing CVPIA water acquisition program.
- The expenditure of ecosystem restoration dollars should be governed solely by natural resource agencies. Such a system will provide protection against restoration funds being used for environmental acquisitions that are actually designed to permit greater Delta exports. Consumptive water users would be protected from harm through the water transfer application process.
- That CALFED is hinging a large part of its restoration efforts on voluntary water transfers is cause for concern considering that a limited number of water districts and agencies control a majority of the water in the state. With such a limited number of sellers, there is some danger that the environmental acquisition program will be charged inordinate prices for its acquisitions, limiting the restoration value of the program. To insure that the ERP achieves its goals, CALFED should seek to permit water transfers from water users, rather than from the water districts. Purchasing water from the end-users will provide the restoration program with a bigger pool of

sellers from which to choose and will bring the price of water down to a true market level.

- Finally, now that the environment has become a coequal participant in the water market, the environment should also be permitted to appropriate unappropriated water in order to meet defined instream flow needs. For instance, if it is a goal of the ERP to acquire additional spring pulse flows, it makes little sense for the ERP (or EWA) to purchase those flows when they can simply be appropriated in many instances to create a permanent instream dedication. If environmental appropriations are not permitted, a consumptive water user might appropriate the surplus water that is presently being put to beneficial use by the environment (perhaps to meet the ERP goals), requiring the ERP to then buy back the same water in order to meet its flow targets. The CALFED restoration program should not have to waste limited restoration dollars to purchase water that the environment has historically put to reasonable and beneficial use.

3. The Environmental Defense Fund supports the Environmental Water Account concept as specified by CALFED: "The EWA would provide fisheries benefits above and beyond the existing 1994 bay-Delta Accord, CVPIA, 1995 Water Quality Control Plan, and ESA biological opinions without adding new regulatory requirements."

Although an "Environmental Water Account" has been touted by senior government officials as a crucial component of any successful CALFED alternative, CALFED's massive multi-volume PEIS/EIR provides little detail explaining how such an account might work. EDF believes that our interpretation of the fundamental component of such an account – the ability to manage water flexibly under real-time biologic and hydrologic conditions – has considerable merit, and could be effectively used in place of at least some prescriptive standards. It is clear, however, that the term "Environmental Water Account" has vastly different meanings to many of CALFED's agencies and stakeholders, including some who clearly see it as a forum for increasing exports from the

Delta. We describe below our view of some of the principles under which an Environmental Water Account should operate – something that is oddly lacking in CALFED's PEIS/EIR.

Existing Conditions

Current operations in the Delta and upstream are generally controlled by a variety of laws, regulations and agreements. In the Delta, export operations are principally controlled by the State Water Resource Control Board's 1995 Water Quality Control Plan (WQCP) but may be substantially revised, as they were in 1999 by implementation of the ESA and CVPIA. A variety of agencies regulate and require flow releases below upstream reservoirs.

These laws constitute the core protective criteria in the Delta under existing conditions. The WQCP is a set of purely prescriptive standards; i.e. flow and export requirements are purely determined by time of year and hydrologic conditions. While they are designed to be responsive to biological conditions, they cannot be modified in real time to respond optimally to biological needs.

Operations pursuant to the Endangered Species Act include both prescriptive rules, such as carryover storage requirements in Shasta Reservoir and April-May export levels. The ESA can also be used to restrict exports in real time due to incidental take. This latter type of operation is especially contentious because its impact of the quantity of exports from the delta is without any specific limit and cannot be predicted.

Operations under the CVPIA have not been well defined due to legal disputes, but may ultimately be defined according to prescriptions, flexible operations or a combination of the two. This dispute may diminish soon following a ruling by the United States District Court.

Most upstream flow requirements are determined in a manner similar to the WQCP standards, in that the flow requirements are purely determined by time of year and hydrologic conditions. An partial exception exists on the Tuolumne River where the

Federal Energy Regulatory Commission has authorized an annual "pulse flow", whose volume is determined by hydrologic conditions but whose timing is not pre-determined.

Meeting these environmental criteria requires a dedication of certain volumes of water to the environment and a limitation of the amount of water that can be diverted or exported for consumptive use. Broadly defined, these laws, regulations and agreements regulate how much water can be diverted from the environment.

Before an Environmental Water Account can be evaluated, the current baseline, including operating criteria as well as other obligations, must be specified. Without a clearly defined baseline, it will be impossible not only to "account" for incremental environmental water, but also to implement CALFED's "beneficiary pays" principle. EDF's letter of September 14, 1999 to Lester Snow on this and other EWA issues is included as Appendix B.

Optimize an Environmental Water Account under Existing Conditions

The first step in establishing an EWA is to estimate what improvements, either in terms of particular species' populations or more broadly using ecological indicators, could be expected by changing operational parameters under existing conditions and with current facilities without affecting the total amount of environmental water. Generally, many perceive, and EDF agrees, that more protection could theoretically be provided with the same amount of water if some of the prescriptive standards were replaced with flexible operations, which could respond to real-time biologic conditions.

The "gaming" exercises, performed by CALFED workgroups, have skipped this important step, however, and proceeded to evaluate an EWA which includes substantial increases in Delta exports. While such analysis may ultimately be relevant, it obscures what benefits might be achieved for the environment by an EWA, and also makes CALFED's environmental stakeholders very skeptical that the EWA is anything more than a gimmick to provide more water to other users.

Optimize an EWA with Additional Resources

CALFED should also add new resources to the EWA. These resources could be a mix of operational, financial and physical tools.

Delta export rates are generally limited to 4600 CFS at Tracy for the Central Valley project and 6650 CFS at Banks for the State Water Project. In the near future, however, it may be possible, with modifications to channel configuration and fish screens, to increase export capacity at Banks to as much as 10,300 CFS. In addition, since the federal and State projects are interconnected, it is possible for the projects to share each others' conveyance facilities, using a "joint point of diversion" (JPOD). Use of the expanded export capacity and JPOD has the potential to change the timing of Delta exports that would lower the impact of export pumping on anadromous and estuarine fish and should be considered as potential additional assets in an EWA.

Water bonds, user mitigation fees, and state and federal appropriations have generated funds that should be used to acquire additional flows for the environment. EDF wholly supports such supplemental environmental acquisitions and recommends that CALFED use these financial tools in the Delta and upstream. We recommend that these funds be used to acquire supplies to meet CALFED's proposed ERP flows – though we regard the flow schedules listed in the PEIS/EIR to be used as guidelines, and not exact prescriptions, for implementation. In addition, funds could be used to pay for dry-year land fallowing, to fund water use efficiency programs (from which saving must be measurably credited to the EWA), or for a variety of other programs. Finally, CALFED needs to coordinate the EWA with an acquisition plan, which should be integrated with CVPIA's acquisition strategy.

It may also be appropriate to invest in some facilities for the EWA. For example, some exports, credited to the EWA, might be placed in south-of the Delta groundwater storage. These supplies could be turned over to water users in lieu of exports when fish are present at the export pumps. EDF does not believe, however, that surface storage is warranted under any of CALFED's alternatives, even if it is built disingenuously "for the environment", in order to mitigate the adverse effects of current water use.

4. CALFED should acknowledge the substantial private benefits that "ecosystem restoration" dollars have and will continue to provide.

The Bay-Delta ecosystem is in a downward spiral, shown most dramatically by the recent endangered species listing of fall-run salmon. In order to reverse this decline and re-stabilize the system – and to avoid new legal restrictions on water use – substantial ecosystem restoration investment is required. Water developers and lobbyists, however, claim that ecosystem restoration has and will continue to receive more than its fair share of public money without substantial subsidies for new water development initiatives. Looking historically at public funding in the name of "ecosystem restoration" and ahead at the beneficiaries of CALFED's programs, it is clear that the water developers' argument lacks any sound economic or financial basis. A significant portion of public money directed to ecosystems has, in fact, conferred significant private benefits. Likewise, CALFED's Ecosystem Restoration, Water Quality, and Water Use Efficiency Programs will provide significant economic benefits to the water user community.

Historical Perspective

Attached is a 4/99 EDF analysis that examines the allocation of "ecosystem restoration" funds appropriated since 1993 – 1994. The analysis quantifies the amount of "ecosystem restoration" funds that have provided direct water user as well as ecosystem benefits. EDF is engaging in a more detailed and comprehensive analysis going forward, but EDF's initial findings suggest a contrary conclusion to the water developers' argument: 69-89% of post-94 Bay-Delta funding has provided joint public/private benefits. Note that the analysis ignores the tens of billions of dollars expended prior to 1992 on California's water development infrastructure, projects that have overwhelmingly prioritized the water users. (See Appendix C.)

EDF has requested a federal budget "cross-cut" analysis that would show how public funding has been spent across agencies/programs. Such analysis would be helpful,

going forward, in determining how public money has been allocated across Bay-Delta beneficiaries.

Future CALFED Public Expenditures

CALFED's ERP benefits water users by protecting species and by improving water supply reliability. The ERP helps water users comply with ESA provisions both directly by protecting fish from pumping equipment and indirectly by preventing habitat degradation, detrimental temperature fluctuations, inadequate flow signals, and other adverse impacts on the ecosystem. Any public ERP funding that restores the populations of declining species and their habitat – e.g., through fish screens or land and water acquisitions – effectively subsidizes the water users who are legally required to invest in mitigation efforts to comply with ESA and other pumping restrictions. In fact, CALFED cites the water diverters as one of the beneficiaries of the Ecosystem Program: "Diverters also could benefit from improved fish screens and ladders which reduce fish mortality and allow for more reliable diversions, and from the lessening of non-native species impacts which can also affect diversions" (Implementation Plan, p. 135). ERP funding not only helps users comply with current ESA laws by subsidizing their mitigation responsibilities but also works to prevent future species listings and higher costs of compliance that would accompany new restrictions: "As fish populations recover, in-delta diverters and upstream diverters could benefit by diversion restrictions being lessened" (Implementation Plan, p. 135). Likewise, as fish populations and ecosystem health improves, "water supplies will be more reliable" for the water users (Implementation Plan, p. 135).

The federal Clean Water Act, the state Porter-Cologne Act, and the biological opinions and recovery plans developed under the authority of the federal and state Endangered Species Acts require improvements in water quality to benefit either endangered species specifically or beneficial uses of water more generally. Paying for these improvements is the responsibility of both pollution dischargers and the same water users affected by the pumping restrictions discussed above. Minimizing water

withdrawals, and its complement, improving water use efficiency, are additional mechanisms to meet legal restrictions established not only in the ESA but in the CVPIA and other authorities as well. As a result, both the Water Quality and Water Use Efficiency components of the CALFED program provide substantial direct benefits to water users by helping to meet existing legal obligations.

5. The decline of the Bay-Delta ecosystem and its native species has been caused primarily by the extraction of water from the system. No additional water should be taken out of the Bay-Delta system for consumptive use until it can be demonstrated that CALFED's ecosystem repair program has significantly improved the ecological health of the Bay-Delta system, and that doing so will not jeopardize further a sustained ecosystem recovery.

A critical underlying assumption of CALFED's analysis is that more water can be taken out of the system during certain peak flow periods with no or minimum ecological impact. CALFED's documents tacitly assume that newly developed water can be stored, managed, and manipulated in a manner that is consistent with the rehabilitation of extensive amounts of instream, wetland, riparian, floodplain, and estuarine habitats and the fish and wildlife populations that depend upon them. There is no credible analysis to support these assumptions. Proposals to export, on average, up to 1.2 million AF/year of additional water (i.e., over and above "Existing Condition" levels – see DWRSIM Study #792) would simply perpetuate current conflicts over inadequate ecosystem flows, particularly during sustained dry periods.

CALFED should instead do the following: (1) endorse a moratorium on new (above-baseline) exports; (2) continue to provide for the ecosystem rehabilitation that has recently been initiated; (3) minimize the demand for additional water supplies by investing in improved end-use efficiency, by pricing water correctly, and by providing mechanisms such as water markets to respond flexibly to changing consumptive needs; and (4) provide water for continued consumptive use via well-regulated, but voluntary water transfers and other operational mechanisms that optimize the efficiency (and minimize the adverse ecological impact) of the water delivery system as a whole. In

addition, CALFED should define clear pre-requisites for lifting the moratorium on new exports that include, in addition to the various "linkages" proposed on pages 85, 92, and 107-109 of the Revised Phase II Report, (1) sustained achievement of specific indicators of improved ecological health as well as (2) comprehensive implementation of basin-specific sustained-yield groundwater management programs.

The need for a moratorium on new water exports is clear. New endangered species listings (and/or proposed listings) occur routinely. The record of water development over the last thirty years suggests that increased exports correlate strongly with decreasing populations of both estuarine and anadromous fish. Of nine well-known species, eight have declined to levels less than 20% of their populations thirty years ago. (The exception is the hatchery-dependent fall-run chinook salmon.) While many other factors have probably contributed to these declines, ocean harvest – often cited as a primary cause of the decline for salmon – cannot be an explanation for estuarine fish. Similarly, predation by striped bass does not provide a convincing reason for the fishery decline because large populations of striped bass coexisted with other species in the 1960s. In addition, major declines in populations of zooplankton, shrimp and fish in the Delta and Suisun Bay over the past two decades suggest they are responding to common stresses. (Herbold et al., 1992. Copy sent with our June 1998 comments.)

We have made substantial efforts to restore some of these populations through protective criteria within the Delta, as specified by the 1995 SWRCB Water Quality Control Plan (implementing the Bay-Delta Accord), and through instream flow criteria specified by the Central Valley Project Improvement Act (although many of those are now being litigated). It is too early to tell whether, or to what extent, these actions will accomplish restoration objectives. Of course, no comprehensive criteria have even been adopted yet, much less implemented and evaluated, to protect spring-run chinook or to implement either the State's narrative objective for doubling natural production of salmon, or the federal obligation to achieve not less than a sustainable doubling in naturally-reproducing salmon and other species of anadromous fish. Nor have the more

general criteria by which one would scientifically assess habitat and ecosystem rehabilitation been adopted.

No decision to lift the moratorium and increase cumulative depletions should be made without evidence that the at-risk species have been stabilized, without evidence that the ecosystem can sustain viable populations of native species, and without a credible analysis of the risks of additional depletions. Specific recommendations for all of these analyses, as well as a discussion of the legal imperative for their inclusion in the CALFED plan, were provided to CALFED in EDF's June 30, 1998 comments on the Initial Draft PEIS/EIR and have been explained further in other correspondence.

6. The Revised Draft fails to specify the legal, financial, operational, and hydrologic baselines that are a critical part of the foundation of any durable long-term program.

A central lesson of California's water development history is that no water "solution" will last unless everyone agrees to the rules up front. Prominent among these is a comprehensive set of baseline specifications that encompass all water uses and water use limitations. Without such rules, water users will continue to seek ways to increase their share of a limited resource, at the inevitable expense of other water users or, more likely, the environment. Such a shift in relative benefits and obligations will undermine support for, and the durability of, any CALFED solution.

The need for explicit legal, financial, and water measurement baselines has been emphasized by EDF in a variety of contexts in the past, including, in particular, our June 1998 comments on CALFED's Initial Draft PEIS/EIR. The fundamental importance of these issues was also made clear in recent correspondence between the U.S. Department of the Interior and the Metropolitan Water District of Southern California, i.e., "the [water] transfers contemplated by the state [as part of the so-called California Plan] cannot occur *unless there is a baseline* upon which conservation and transfers can be measured..." (Letter from David J. Hayes to Philip J. Pace dated February 1, 1999; emphasis added). A clear and comprehensive operational baseline will also be needed to

make the EWA a success, whether in terms of who gets "credit" for what water and when or who, in the end, will be expected to pay for what.

Unfortunately, the Revised Draft PEIS/EIR fails to analyze or define meaningful strategies to address any number of the "lack of baseline" problems that have been used to justify constructing and subsidizing prior water project developments. For example, while the state and federal projects were each justified in part to address groundwater overdraft problems in the San Joaquin Valley, neither project required groundwater metering nor any meaningful limitation on increased acreage as a condition for the provision of newly-imported surface water supplies. CALFED appears to be contemplating a third generation of water project development, justified in part to address alleged continuing San Joaquin Valley groundwater overdraft problems, but still without a required program to address the groundwater side of the equation. (For example, only "modeling and monitoring" – but still not management – are proposed as groundwater-related contingencies on the future decision to construct new surface water storage facilities. See Revised Phase II Report, p. 108.)

The Revised Draft also fails to analyze the extent or adequacy of any prior unmet water user mitigation obligations, including those required by law as an outgrowth of Fish and Wildlife Coordination Act consultations undertaken for authorized federal projects since at least the 1950's. Such analysis is needed if CALFED is to equitably apportion allocated costs between those associated with unmet environmental "mitigation" obligations (part of the baseline) and bona-fide (above-baseline) ecosystem benefits.

In this context, the Revised Draft still fails to provide a meaningful (i.e., verifiable or quantifiable) definition of "water supply reliability." Moreover, while the Program's water supply reliability objective is to "reduce the mismatch between available supplies and current and projected beneficial uses," that objective will be impossible to achieve without a clear definition of each element of the underlying equation, presumably based on a probabilistic assessment of all Bay-Delta inflows and outflows – i.e., a comprehensive surface and groundwater budget, both "baseline" and proposed.

The Revised Draft also continues to draw upon the substantially flawed assumptions and methods that underlie DWR's Bulletin 160-98 Report. We would only re-emphasize here that the Revised Draft PEIS/EIR will perpetuate, build upon, and perhaps even make worse the problems inherent in Bulletin 160-98 because it relies upon the PEIS/EIR to a very significant extent for its baseline and projected water use/demand assessments. (Because of that reliance, CALFED should consider the Bulletin 160-98 public comment record to be part of the public comment record on the Revised Draft PEIS/EIR and request specifically that EDF's documents be so incorporated.)

The Revised Draft also implements flawed assumptions of its own, including an assumed "No Action" increase in south-of Delta exports over "Existing Condition" levels by as much as 431,000 AF/year, on average (DWRSIM Study #786). This can hardly be called a "No Action" scenario.

To address these and related problems, a truly durable and comprehensive CALFED solution must include meaningful and comprehensive surface and groundwater management, comprehensive measurement and metering, a finite water-depletion budget, and a robust and protective ecosystem baseline.

7. CALFED should select its water management plan on the basis of sound economics and explicit financial criteria.

CALFED should ensure that any decisions to develop "new" water be based on sound economic and financial principles. Before CALFED commits to any new water management project, CALFED should continue to analyze the costs of supply scenarios, as it has begun in its Economic Evaluation of Water Management Alternatives (EEWMA), and develop clear financial criteria for who pays for what. CALFED should devise a set of principles for investment in new infrastructure that would approve such investment only where it is economically and environmentally justified and where the beneficiaries of such investment commit to pay the full financial and environmental costs of that investment.

Economic Principles

Our previous comments criticized CALFED for neglecting an economic analysis of the supply and demand factors that affect the selection of "new" water supply measures. CALFED has responded to our concerns by developing the Economic Evaluation of Water Management Alternatives (EEWMA). Through the EEWMA, CALFED has calculated the costs of various water supply projects in different regions according to stakeholders' preferences. The EEWMA takes a good first step at analyzing the cost of supply measures compared to others. By matching the cost of water supplies to users' demand functions, the EEWMA attempts to select both the economically efficient portfolios of water supply options and quantities of "new" water. The EEWMA's premise makes sense: match the cost of water to the willingness to pay and let the market decide how to develop the water and how much to develop.

As is stands, the EEWMA's "costs" greatly understate the actual costs of producing each "new" unit of water. As a result, the quantities of water deemed economically efficient are above the socially optimal levels of water supply development. Underestimated costs will also make some water supply options artificially more attractive than others. The EEWMA's analysis cannot, therefore, provide CALFED with economically accurate answers until it reports costs that reflect the true social as well as private costs at the margin:

- **Internalizing environmental externalities**

  The costs of water development should reflect the ecosystem damages associated with water development or use. A price that does not include public externalities only neglects and postpones costs that must be paid later, either in the form of more expensive mitigation and/or as irrevocable environmental degradation and species loss.

See attached analysis in which EDF reconstructs the annual cost summary presented in the EEWMA report, Appendix D. EEWMA compares the costs of meeting consumptive use needs under a variety of scenarios. Note that the EEWMA's Environmental scenario is more expensive than the Unconstrained – or least-cost – scenario, in only two of the five regions. Total costs in the Environmental scenario across all regions are only slightly higher than the total costs of the Unconstrained scenario. These extra costs could be internalized if prices and costs reflected ecosystem damages. If the unconstrained scenario internalized environmental costs, it might well be as expensive or even more expensive than the environmental scenario.

- **Accounting for public subsidies**

  As long as the public subsidizes water development infrastructure, water users will support large and expensive projects that aren't cost-effective. The EEWMA has allowed stakeholders to include specific subsidies in their preferences. The EEWMA should address the economic inefficiencies associated with subsidies and internalize the subsidy costs so that users' willingness to pay is based on total project costs, both private and public.

- **Linking Incremental Costs to Incremental Prices**

  It makes no economic sense for water users to purchase new water-supply infrastructure that it cannot afford. The price of each "new" unit of water should signal the incremental cost of developing that unit. If prices do not reflect incremental costs of production, water users do not have correct price signals to choose economically efficient quantities of water. The cost of expensive water supply measures – and specifically, costs that are higher than water users' willingness to pay – should not be disguised by blending exorbitant incremental new costs with low existing costs.

We look forward to continuing our work with the EEWMA as it develops. We hope that the EEWMA will address and integrate the results of the CALVIN project that EEWMA contributors, Jay Lund and Dick Howitt, have constructed in conjunction with UC Davis.

Financial Principles

The draft finance plan – described more accurately as "the initial framework for developing" a finance plan – continues to describe the "beneficiary pays" approach as "a fundamental principle" of the overall CALFED program. While a marked improvement over earlier versions, however, the draft "plan" raises at least as many questions as it answers, and fails to propose such specific rules and commitments as would be needed to give meaning to such a fundamental program principle.

"A fundamental principle of the CALFED Program is that the costs of a program should be borne by those who benefit from the program." Although this is the exact language contained in both the December 1998 and June 1999 Revised Phase II Reports, it has been restated in the June 1999 Implementation Plan as follows: "A fundamental philosophy of the CALFED Program is that costs should, to the extent possible, be paid by the beneficiaries of Program actions." Whether stated as principle or philosophy, the phrase "to the extent possible" is a particularly noteworthy and troublesome, addition.

As the document itself makes clear, the June 1999 Financing Plan (section 5.0) is actually only "the initial framework for developing a CALFED finance plan." While the information contained in section 5.0 includes some very helpful analysis of the all-important issue of deciding who, in the end, will be asked to pay for what, it seems truly remarkable that the Program would offer up only "an initial framework" for the financing of what currently amounts to a $5+ billion Stage 1 program after four years of work and less than 12 months away from the Record of Decision for the program as a whole (currently scheduled for June 2000). CALFED assures us, however, that it "will work to complete the Finance Plan in 1999, but no later than the time of the ROD" (Implementation Plan, p. 89).

Of course, the stakeholder community as a whole, and the water user community in particular, has focused the bulk of its efforts since 1996 not on the affirmative development of an equitable set of "benefits based" financing rules, but on the authorization of more than $3.0 billion in state-issued general obligation bonds and federal taxpayer-financed appropriations for a host of projects and programs directly or indirectly related to CALFED's scope of activities. (We anticipate another round of federal authorizing efforts to take place as early as this fall.)

The recent call by Governor Gray Davis and Interior Secretary Bruce Babbitt for more state and federal funding (but with no mention of CALFED's "fundamental" financing principle) calls further into question the relevance of the entire Finance Plan effort. So too do statements like the following: "[a]fter the benefits analysis and cost allocation, CALFED may propose cost shares that differ from existing state and federal cost sharing formulas, or may use the cost sharing formulas in existing programs" (Implementation Plan, p. 90).

At least the current draft Implementation Plan admits that "CALFED's finance strategy must be considered within the current and historical context of state and federal water resources financing" (p. 90). This is, in fact, a significant step forward, and the ensuing discussion, plus summary tables and analysis, combine to demonstrate the wide range of alternative financing rules and payment responsibility considerations that currently underlie the efforts and authorities of the involved CALFED agencies. (Even that, however, is incomplete.) Unfortunately, the draft stops short of documenting what this hodge-podge of historic financing rules has actually led to in terms of cumulative dollars expended on behalf of (and taxpayer subsidies enjoyed by) different beneficiary groups, let alone how those results, in turn, should be factored into decisions concerning the meaning of "balanced implementation" or "equitable results." These and related issues were actually key parts of the "financial baseline analysis" that EDF and others sought from CALFED for the better part of 3 years, but that the CALFED Policy Group decided "was not a useful principle, and should not be pursued as part of the financing strategy," back in May 1998. (See Policy Group minutes, May 1, 1998.)

We are thus left to wonder: whatever happened to the coherent, equitable, and durable financing strategy that was at one time a major hope (and expectation) for the CALFED program moving forward? What about the express affirmation in state Proposition 204 that, in exchange for advance funding, the program would develop "an equitable allocation of program costs among beneficiary groups" as part of its comprehensive plan? All of that, it seems, is yet to come, even as new taxpayer funds are sought and secured.

To be fair, the draft finance "plan" raises a number of important policy issues/questions that deserve careful consideration and response as part the ongoing process to convert this "initial framework" into a bonafide financing plan. (This then raises an important question in turn: what, specifically, does CALFED intend to do to bring such a plan to fruition in the next 6-9 months?)

The draft "plan" also makes significant, if admittedly incomplete, progress towards establishing a "Broad Based Bay Delta System Diversion Fee." While we have many specific concerns and suggestions in this regard, some variant of this concept remains critical to the long-term success of, among others, the kind of comprehensive, long-term, supplemental environmental water acquisition program that will be needed to achieve CALFED's flow-related ecosystem restoration objectives. (See section 2 of these comments for additional discussion.)

For this reason alone, the refinement and implementation of a comprehensive set of impact-based mitigation fee(s) should become a critical element in the CALFED assurances package. The fees should be watershed (or "problemshed") in scope, include hydropower and other environmentally-damaging water resource development functions, target a secure and sustained "above baseline" funding objective of at least $110 million annually (Implementation Plan, Table 5.5), provide for meaningful coordination (if not integration) with the CVPIA and other related Bay-Delta ecosystem restoration programs, and resolve a host of critically-important budgetary and fund-management details. And, consistent with the beneficiary pays principle, any and all refinements should be careful to sustain the commitment that "[n]o consideration is being [or will be] given to using

[such] fees for the construction of new surface storage [or other] projects benefiting water and power contractors or to many other program elements where private cost sharing has been the norm" (Implementation Plan, p. 154).

The draft "plan" also includes a number of erroneous assertions and/or omissions. For example:

- Table 5.1 of the Implementation Plan suggests that the "effective local cost share" for SWP construction is "close to 100%." While SWP finance and repayment policies certainly put the effective local cost share a lot closer to 100% than the other alternatives examined (and hence closer to the spirit of "beneficiary pays" as well), the actual effective cost share is between 70-80% and even that calculation ignores the unmitigated costs of environmental damage (Appendix E) or the refinancing or cross-subsidy effects of the infamous Monterey Accord.
- Page 102 of the Implementation Plan asserts that "appropriately designed storage facilities can also provide flows for environmental purposes," a statement that is then used to justify public water development funding but that ignores the simple fact that any water so developed would have to be appropriated from the ecosystem in the first place. (This, of course, is also one of those simple truths that distinguishes "the ecosystem" from "water users" generally.)
- Pages 136-137 provide a helpful summary overview of "existing program elements and funding," but make no mention of the hundreds of millions of dollars in non-ecosystem funds provided by state Proposition 204, regular annual "water and related resources" components of the federal Energy and Water Appropriations bill, or a myriad other sources (including, at least prospectively, the recently-passed $1.97 million state water bond) which are closely if not directly related to CALFED's programmatic purposes. (We remain hopeful that a long-promised "federal budget crosscut" will begin to shed some needed light in this area. See also section 4 of these comments, and Appendix C.)
- There is no discussion whatsoever of the "schedule of eligible projects" that is required to be set forth in the final PPEIS/EIR as a pre-condition to expending the

$390 million in sequestered ecosystem restoration funds provided by state Proposition 204 in 1996.

Finally, the draft "plan" includes some very substantial (and critically important) programmatic capital cost estimates for which little, if any, documentation is provided. (In the ecosystem context especially, the associated need for non-capital funds – for term-limited acquisitions, adaptive management, and a host of stewardship needs – remains a critical missing element in the overall implementation budget, and one that links back directly to the need for sustained annual use-based funding.)

For these reasons, on this issue as on many others, CALFED's "plan" is incomplete and uncertain to the point of making it effectively impossible for EDF (or any other commentator) to state a definitive opinion. EDF thus must respectfully dissent from CALFED's financing plan (such as it is) until such time as substantial additional detail is provided and which, upon revision, lives up to the promise implied in its fundamental "beneficiaries pay" financing principle.

8. CALFED needs to approach a new water management scheme without new surface storage, which has not only devastated the Bay-Delta in the past but is not cost-effective for the future.

Surface storage is a vital component of California's water supply system. Without surface storage, we could not sustain out urban populations or our agricultural economy. California currently has, however, more than 1,300 dams with a total storage capacity of over 42,000,000 acre-feet of water. 256 of these dams are more than 100 feet tall. While the current facilities and their operations have been instrumental in helping California grow and develop, our State's once-glorious natural waterways have seriously declined. It is this devastation, along with the listing of a variety of species under the Endangered Species Act, which originally led to the formation of CALFED.

EDF believes that California, through CALFED, needs to take a new approach to water use. This approach would emphasize conservation, recycling, reclamation and

transfers of water among willing sellers.[2] We especially believe that removing institutional barriers to transfers between willing buyers and sellers would create significant incentives for increased efficiency and economic productivity. (See Section 1 of these comments for additional discussion.)

CALFED's economic studies (through the EEWMA) have indicated that new storage projects are rarely economically feasible. In the few cases where new storage is shown to be more cost-effective than competing options, the margin of savings is small and depends on aggressive and environmentally unacceptable operating rules for the new facility.

For example, CALFED's own economic analysis has shown that new storage would play a small role in an economically optimal resource plan to meet California's water needs through 2020. The studies indicate that no new surface storage is cost-effective for agriculture. The studies do indicate, however, that new off-stream surface storage in the Sacramento Basin is cost-effective for meeting the needs of urban southern California, if considerable amounts of late winter and spring flows are diverted from the Sacramento River into the off-stream site for later use.

CALFED's water supply studies, which assume such aggressive operation of off-stream storage projects show a significant decrease in the level of "X2" protection provided in the Bay-Delta estuary between February and June.[3] Under the assumptions contained in CALFED's DWRSIM Study 801, which assumes diversions to new storage, the average springtime X2 location is moved upstream by 1.3 KM between February and June. In dry years the salinity would intrude by an average of 1.7 KM over the 5-month period.

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[2] See "Blueprint for an Environmentally and Economically Sound CALFED Water Supply Reliability Program," Appendix A.

[3] X2 is the tidally averaged location of the 2-PPT salinity isopleth, measured in kilometers from the Golden Gate. X2 management is a cornerstone of the SWRCB 1995 Water Quality Control Plan as well as an identified objective under the Anadromous Fish Restoration Program.

CALFED's analysis has shown that meeting the same new water supply needs without new surface storage would only increase costs by 5.16%.[4] While we have concerns that CALFED's economic analysis, if some of the assumptions regarding cost, yield and demand elasticity were more realistic, would suggest that no new dams were warranted, we believe that 5% would be a small price to pay to avoid the environmental impact associated with new facilities.

CALFED needs to try a new approach. If the new approach fails, the dam sites will still be available in the future. Despite the well-publicized deconstruction of some small dams, any construction of new dams is likely to be permanent.

9. EDF opposes the Hood diversion, which the June 1999 Revised Draft appears to authorize, because the diversion is very likely to have devastating impacts on salmon species. CALFED should analyze other feasible methods to improve water quality for urban users.

As was noted above and in excellent letters conveyed to CALFED by Senator Barbara Boxer and Congressman George Miller, the June 1999 Draft can be read to authorize the northern leg of the Peripheral Canal. (See Appendix F.) In addition to the points revised in the Boxer/Miller letters, EDF would note that the facility is very likely to have a devastating effect on all salmon species that inhabit the Sacramento River and its tributaries, including the Sacramento fall-run, the only Central Valley species still present in large numbers. When adult salmon return to fresh water to spawn in the stream where they were born, they use the scent of the water to find their way. If water is diverted through the Hood diversion into the Mokelumne River as proposed, returning adult salmon will be misled into the Mokelumne River and then to the diversion. Since the diversion will be screened, the salmon will be unable to get back to the Sacramento River and will die without spawning. This effect could be most dramatic on fall-run, as fall is often the time when the Hood diversion would most likely be used to improve

[4] CALFED's EEWMA report compares total costs for meeting water supply needs in 2020 under a variety of scenarios. The environmental scenario constrained by not allowing construction of new surface storage is only 5.16% more expensive than the "unconstrained" scenario. (See Appendix D.)

water quality. At a minimum, the facility should be evaluated with operable screens, which could be used both to prevent out migrating salmon from entering the central Delta, but allow spawning adults to return to their stream of origin.

Drinking water quality is a critical issue for all Californians and a crucial part of any long-term solution. By failing to analyze other feasible alternative ways to improve export water quality for urban users, CALFED violates its own principle that any *solution have no significant redirected impacts.*

Most of the water exported from the south Delta is low in salinity; it is only occasionally that salinity at the export pumps is high. In addition, most of the water exported from the Delta is for eventual agricultural use, where salinity is not an acute problem. CALFED has not evaluated scenarios that would, through reoperation south-of-Delta, dedicate the lower salinity water to urban uses. In addition, CALFED has not analyzed scenarios that would exchange low salinity water from southern Sierra streams, which currently are dedicated to agricultural use, for Delta water. Under such an exchange, the lower salinity water would provide much more significant water quality benefits than the proposed diversion at Hood.

10. Effective ecosystem restoration is the most significant ESA assurance that can be provided to water users. Although mechanisms such as the EWA can be used as a first resort to respond to the needs of listed species, "reinitiation of consultation" (and the potential additional water supply restrictions that may result) must remain as the final resort.

In its initial incarnation, CALFED sought to accomplish a number of interrelated goals that relate to the Endangered Species Act. Two of those primary goals were: seeking to achieve "recovery" of candidate, threatened, and endangered fish species that live or pass through the Bay-Delta; and seeking to improve water supply reliability, by attempting to minimize the water supply uncertainties that result from implementation of the ESA. More recently, CALFED has redefined its mission to include improving water supply reliability by potentially increasing water diversions from the Bay-Delta ecosystem. Against this background, water users continue to demand "assurances" from

CALFED with respect to the Endangered Species Act that would eliminate new water supply restrictions to protect species.

The promise of the Endangered Species Act, that the United States will no longer sit by and watch its native species disappear, means that there is only one course available in the long term to provide meaningful improvements in water supply reliability, and that is to actually improve the health of the Bay-Delta ecosystem including the health of those species that are protected under the ESA. Only a healthy ecosystem, with robust populations of delta smelt and stable salmon populations, will permit the USFWS and NMFS to reduce the limitations that are currently placed upon export pumping. And only a healthy ecosystem will insure against listings of new species and potential imposition of new, more stringent requirements. Whatever other "assurances" CALFED attempts to provide water users – whether through biological opinions, the EWA, or HCPs – those assurances may not undermine the fundamental premise of the ESA, that species may not move towards extinction. This fact is illustrated on page 7-20 of the MSCS, where the general conditions for reinitiating section 7 consultations are listed; these conditions for reinitiation add unavoidable uncertainty to any assurance package.

The risk that new water supply restrictions might be imposed in response to the continuing decline of listed species can be significantly reduced in the short term using mechanisms such as the EWA and by fully implementing the provisions of existing laws (such as the "b2" provision of the CVPIA). If designed properly, EDF supports the use of the EWA to avoid damage to species and thus avoid the need for additional ESA restrictions. In fact, the EWA could be the first of several mechanisms that are sequentially engaged to avoid ESA restrictions. As a matter of law, however, reinitiation must always be available as the ultimate recourse for species survival.

Achieving the MSCS goals for the recovery of listed species provides a clear framework for an assurance package that will both benefit the environment and drastically improve the water supply reliability for water users. Despite this clear solution, CALFED has put forward a program with an unduly complicated, and legally insufficient, means for achieving ESA compliance. Part of the complication appears to

come from a perceived need to build more conveyance and storage structures – with inevitable environmental impacts – before the MSCS restoration goals have even been achieved. Consistent with the principle of adaptive management, CALFED should first see what level of water supply reliability can be achieved once the MSCS goals have been reached, and only if that level of water supply reliability is insufficient should CALFED consider undertaking water management programs that are likely to adversely impact the environment.

The MSCS Cannot Form the Basis for Tiered ESA/CESA Compliance

The MSCS describes a highly deficient ESA/CESA compliance package. The MSCS states that the MSCS will serve as the biological assessment for the section 7 consultation of the CALFED Program. The MSCS states that any implementation actions with a federal nexus will have their own section 7 consultation, and that such consultations will be tiered off of the programmatic consultation.

This plan for tiered section 7 consultations has a few significant flaws:

- First, none of the documents that have been provided by CALFED have a sufficient level of environmental review to justify use of the MSCS as a biological assessment. The present documentation represents little more than a description of actions that *may* be undertaken to benefit fishery species.
- Second, considering that funding has not yet been committed to undertake any of the actions in the MSCS, and considering how heavily the MSCS relies upon adaptive management, there is no way to know what actions will actually be undertaken as a part of the MSCS, let alone what level of ecosystem recovery will actually be achieved. Due to the significant uncertainty as to how the MSCS will actually be implemented, it is inappropriate to use the MSCS for tiering section 7 consultations. At most, any section 7 consultation for implementation actions should only consider those restoration actions that have already been undertaken by CALFED. Consideration of actions that have already been taken does not, however, require

CALFED to do a "tiered" analysis; it merely requires CALFED to look at the biological situation as it exists at the time of consultation.

- Finally, we note with approval the statement in section 1.2 of the MSCS that both the Program as a whole and individual CALFED actions must comply with the ESA. As we have noted before, restoration actions undertaken as a part of the ERP should not be used as ESA mitigation for impacts caused by water development programs. This principle is reiterated on pg. ES-6 of the MSCS, where it explains that the MSCS involves two types of conservation measures: those designed to mitigate for CALFED Program impacts and those designed to meet species recovery goals. We would add that much of the species recovery work is also legally-mandated mitigation. Consistent with the CALFED "user pays" financing principle, all mitigation measures undertaken in response to CALFED actions must be paid for by the beneficiaries of the program that creates the environmental impact. Despite the MSCS' efforts at distinguishing restoration actions from mitigation actions, there is a significant danger of violating the "user pays" finance principal if restoration actions and water development programs are evaluated in the same ASIP (allowing one to mitigate for the other), as is called for in section 7.4.3 of the MSCS.

Selected Appendices

A. *Blueprint for an Environmentally and Economically Sound CALFED Water Supply Reliability Program* -- Save San Francisco Bay Association et al., November 5, 1998.

B. Letter to Lester Snow from Spreck Rosekrans, EDF, September 14, 1999.

C. *Balanced Funding and the Bay-Delta Conundrum* -- Memorandum from David Yardas, EDF, to Interested Parties, April 24, 1999.

D. *Explanation of EEWMA Table 8.1 Reconstruction: Analysis of Annual "New" Supply Costs and Isolated Facility Cost Internalization* and attached analysis -- Angela Sherry, EDF.

E. *The California State Water Project (SWP): A Preliminary Investigation of Financing and Subsidies - Draft"* -- Christopher LaFranchi, August 1998.

F. Letters to Lester Snow, from Senator Barbara Boxer and Congressman George Miller, August 24, 1999 and August 26, 1999.

APPENDIX A

BLUEPRINT FOR AN ENVIRONMENTALLY AND ECONOMICALLY SOUND CALFED WATER SUPPLY RELIABILITY PROGRAM

November 5, 1998

Save San Francisco Bay Association
Natural Resources Defense Council
The Bay Institute of San Francisco
Environmental Defense Fund
Natural Heritage Institute
Sierra Club
California Trout
Public Officials for Water and Environmental Reform
League of Women Voters of California
Center for Marine Conservation
Mono Lake Committee
Clean Water Action
California League of Conservation Voters
California Sportfishing Protection Alliance
Pacific Coast Federation of Fishermen's Associations
Friends of the River
Marin Conservation League
Sierra Nevada Alliance
Earth Island Institute

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INTRODUCTION AND SUMMARY

The mission of the CALFED Bay-Delta Program is to develop a comprehensive plan to restore the ecological health and improve management of water in the San Francisco Bay-Delta system for all beneficial uses. While CALFED has made substantial progress toward a program for restoring ecological health, it has struggled with developing a water supply reliability program and has confronted serious disagreements regarding the need for new surface storage facilities. The time has come to move forward with creative, viable solutions.

A viable CALFED solution must do more than restore the health of the Bay-Delta ecosystem. It must also improve the reliability of water supply for California's urban and agricultural economies. This blueprint articulates our assumptions and concerns, and outlines our recommendations for developing an affirmative program for improving water supply reliability.

We're committed to finding a CALFED solution that works for all of California.

Our Assumptions:

- **Defining "reliability."** What matters is the economic utility of water, not solely how much is delivered or diverted from the Delta. CALFED has confused quantity with water reliability. CALFED should adopt the following definition of water supply reliability:

  Improving the predictability and availability of economic benefits derived from water while restoring ecosystem health in the Bay-Delta estuary and watershed.

CALFED also should focus on providing water users with an economically and environmentally sound suite of dry year reliability strategies.

- **Let's be fair.** There are fundamental inequities in California water. Some water users pay a lot for the water they receive and others pay little or nothing. Some are contributing to Bay-Delta restoration, while others are not. Some meter their water use and prepare and implement conservation plans. Others do not. Some have very reliable water supplies. Others do not. While CALFED did not create these problems, it must address them.

- **Ecosystem restoration improves water supply reliability.** Restoration of the Bay-Delta ecosystem is the foundation of all efforts to improve water supply reliability. As long as species and habitats continue to decline and be degraded, we will continue to contend with regulatory uncertainty.

- **There is no "new" water.** There is a finite amount of water in the system. What some have called, "new" water is, in fact, further reallocation of water from the environment. The ecosystem has been depleted to the point where its resources are crashing. We can use our current supplies better, rather than trying to build our way out of our problems.

- **First, do no harm.** Any water supply reliability activities undertaken pursuant to a final CALFED decision should support full ecosystem recovery and should not cause further ecosystem degradation.

- **Price matters.** No one, especially the taxpayer, wants to pay more than needed to solve these problems. In addition, moving aggressively towards pricing that reflects the economic and environmental value of water will encourage efficient water use.

Our Concerns

- **Baseline, Baseline, Baseline.** CALFED has not provided a clear and accurate picture of historic and current water supply, demand or use by any sector. Defining an accurate and comprehensive "baseline" is a critical issue not only for purposes of clear accounting, but because inaccurate claims and beliefs are driving policy decisions.

- **Dams or No Dams? Wrong Question.** Unfortunately, the past year has been characterized by a divisive preoccupation with arguments for and against the construction of new surface storage. The issue of surface storage has somehow become divorced from the key questions CALFED was created to answer: how best to restore the ecosystem and reliability of water supply and water quality. CALFED should begin its stage 1 program by implementing environmentally and economically sound water supply reliability tools, such as groundwater storage, transfers, conservation and reclamation, to produce near-term benefits and inform long-term decisions about water supply. Although we do not support CALFED's current presumption regarding the need for new surface storage, we believe that surface storage should continue to be evaluated in light of the potential benefits of the water supply reliability tools described in this document.

- **"Let's Get Better Together" Has Become Code For "If I Don't Get Better, Neither Should You."** This 'quid pro quo' philosophy ignores the fact that the interests do not come to the table as equal players – the ecosystem is on the verge of collapse, while the agricultural and economic sectors have continued to thrive.

- **More of the Same is Not the Answer.** The ecosystem has borne the brunt of conventional water development for more than a century. There is no better reason for looking for a new approach.

Our Water Supply Reliability Program

This blueprint discusses a variety of water supply reliability tools. The table below summarizes a preliminary range of yield and storage which could be produced by these tools and which should be shared between the environment and consumptive water users.

Table 1: Preliminary Summary of Potential Water Supply Reliability Strategies*

	Strategy	Potential Yield (acre-feet)
Demand side	Irrigation efficiency	340,000-1,700,000
	Voluntary fallowing (dry year, rotational, permanent, etc.)	420,000-2,100,000
	Water acquisitions and transfers	Composite of irrigation efficiency, fallowing, groundwater and others.
	Full implementation of urban BMPs	1,500,000
	Improved landscaping requirements	520,000 -1,400,000
	More efficient washing machines	97,000-194,000
	Commercial ultra low flow toilets	200,000
	Existing residential indoor BMPs above MOU-specified levels	300,000
	Existing commercial, industrial and institutional BMPs above MOU-specified levels	350,000-650,000
	Reclamation and recycling	1,170,000-1,720,000
Supply side	Groundwater banking and management	900,000-1,000,000
	Delta reoperation	122,000-137,000
	Upper watershed restoration	No estimate available yet.
	Flood reservations	400,000-600,000 (Storage)

* As discussed above, CALFED's water supply reliability program must provide water to support Bay-Delta ecosystem recovery. This will require substantial amounts of water. Improving Delta flow conditions in Stage 1 may require 123,000-372,000 acre-feet. Further improvements for upstream areas and Suisun Marsh will require additional water.

These preliminary figures are not additive. However, these tools offer the potential to go far beyond what CALFED has considered to date and could generate millions of acre feet of water for all users. They can form the basis for an environmentally and economically sound water supply reliability program. Section 3 discusses each of these strategies in greater detail.

This blueprint is focused primarily on tools to generate water supply reliability benefits. Further work needs to be done on programs to address water quality and other program objectives. However, it is clear that by developing a water reliability strategy by using above water supply tools, CALFED can help meet its other program goals. An approach which truly produces multiple beneficiaries is most likely to prove cost-effective.

Our Preliminary Recommendations

We applaud CALFED's effort to begin identifying specific actions for Stage 1. However, the measures proposed in CALFED's draft preferred alternative document reflect a bias in favor of new surface storage and a tepid effort on alternative approaches. In contrast, we propose a set of Stage 1 actions in Section 4 that emphasizes:

- Maximizing conservation and recycling potential;
- Jumpstarting groundwater management and appropriate storage;
- Facilitating appropriate water transfers;
- Ensuring environmental water reliability;
- Improving the operation of existing dams and canals;
- Developing a comprehensive water supply/demand baseline ;
- Developing realistic modeling assumptions; and
- Pricing water to reflect its true economic and environmental value.

Our Commitment

Our organizations are committed to fixing the environmental and water management problems in the Bay-Delta Estuary. We believe that CALFED's original approach – to address these problems in a broadly-supported, comprehensive package – is correct. We invite all stakeholders and public officials to join us in a productive dialogue to craft a solution that brings Californians together.

SECTION I: OBJECTIVES FOR WATER SUPPLY RELIABILITY

A. CALFED Has Failed to Adequately Define Water Supply Reliability

CALFED currently defines its water supply reliability objective as:

> Reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system. This strategy seeks to: reduce the mismatch between supply and beneficial uses through a variety of actions; reduce the impacts of water diversion on the Bay-Delta system; and increase the flexibility to store and transport water. (Phase II interim report)

This objective is impossible to measure, in sharp contrast with the intense efforts to quantify the goals of the ecosystem restoration program and to develop measurable targets. In addition, the current CALFED approach to water supply reliability fails to:

- **Recognize that the price of water has an effect on both the demand for water and the supply of water.** As the cost of developing additional water supplies increases, demand for water will decrease and other sources of water (e.g. transfers and conservation) will become even more competitive. CALFED has not adequately integrated core economic principles and analysis into its water supply reliability planning.

- **Establish a level playing field between strategies focused on supply and demand.** If increased storage is itself an objective, then demand side strategies, no matter how successful, are doomed to be inadequate. CALFED has assumed a very limited approach to demand-side management, overstated future demand (see Section II), and then concluded that new reservoirs are "necessary" to meet the reliability goal. Indeed, CALFED has gone so far as to identify increased storage as a specific program objective, rather than identifying storage as a means (on a par with conservation and other options) for attaining the reliability goal, thus creating an inherent bias.

- **Integrate the role of the environment in determining water supply reliability.** Healthy aquatic ecosystems require water supplies of adequate quantity, quality and timing. CALFED's definition of reliability fails to reflect these needs. Nor does it reflect the increased water supply reliability that would accrue to water users once the ecosystem has achieved a level of health and sustainability. By ignoring environmental requirements, and the reliability implications of environmental degradation, CALFED's reliability objective biases the program in favor of strategies which are the least compatible with ecosystem health.

B. CALFED Should Redefine Its Water Supply Reliability Goals

CALFED's water supply reliability program must contribute to the long term health of the urban, agricultural and fishing industries which depend on the Bay-Delta, as well as the environment. It is our view that **water supply reliability is more accurately defined as improving the predictability and availability of economic benefits derived from water, while restoring ecosystem health in the Bay-Delta estuary and watershed.** We propose to shift CALFED's reliability objective from its limited focus on increasing absolute amounts of water available for consumptive use to increasing the predictability of benefits. More water is only one of many ways to achieve such predictability. In fact, during the 1987-1992 drought, maximizing water deliveries resulted in drained reservoirs, devastated fisheries and decreased predictability. Our definition of water supply reliability includes three major component objectives:

1. Improve the long term economic benefits of water supply to sectors of the California economy dependent on Bay-Delta water supplies.

CALFED should recognize the ability of individual water users to utilize both supply- and demand-side strategies. Supply alone fails to provide predictability of benefits and fails as an adequate measure of reliability. For example, growers can adapt to lower dry year contract supplies through conservation and water transfers. By providing a range of viable water reliability strategies, CALFED could help maintain the long-term profitability of a given grower, even if dry year contract deliveries remain unchanged. The bottom line for agricultural, municipal and industrial users is not unit of water delivered, but rather the benefits derived. [1]

Measuring economic benefits by sector will provide a valuable indication of the true value of water supplies. Such an approach will also adjust for regional variances. Finally, we recognize that tying the water supply reliability objective to economic benefits is complex, since a variety of factors affect economic well being (e.g. interest rates and market conditions). However, this is no different than CALFED's proposals for measuring ecosystem health, which is similarly dependent upon factors outside the control of the CALFED program.

2. Improve predictability of water availability to individual water users and districts in dry years.

A program focus on assuring long term economic productivity will go a long way toward ensuring the adequacy of water reliability. However, we recognize that it may not be fully adequate to address water needs during particularly dry years. Under the current water management regime, the next drought is likely to result in further ecosystem

[1] We believe that this economically-oriented objective incorporates the provision of adequate supplies for basic indoor domestic water use. Moreover, adequate drinking water supplies are not a limiting factor in achieving water supply reliability.

degradation and unpredictability for consumptive water users. CALFED should attempt to increase the predictability of water availability during dry years. Volume of contract deliveries alone is inadequate to measure dry year predictability.

The limits of using contract deliveries as a measure of success is amply demonstrated by the continued productivity of Central Valley agriculture during the 1987-1992 drought, despite reductions in contract deliveries. CALFED should adopt an objective that focuses on water availability to individual water users and districts, rather than the current focus on water contract deliveries to regions. Such dry year strategies could include dry year supplies from conjunctive use programs, water transfers, voluntary fallowing, conservation, purchased storage in existing surface reservoirs and more, in addition to contract deliveries. Strategies to increase the predictability of dry year supplies should not be designed to prevent any change in water use during dry years. Rather, they should be designed to reduce dry year impacts and provide options for water users. In the context of these options, we expect that some individual water users and districts will choose to enter dry year water markets as sellers and others as purchasers. Encouraging well-informed decisions by water users among a variety of options is perhaps CALFED's best strategy to promote efficient water use and reduce impacts during times of shortage.

In practical terms, there is a major difference between solutions that improve dry year benefits and those that improve average year benefits. For instance, water transfers designed to increase reliability in dry years (e.g. dry year options) can help keep agricultural land in production. These same market strategies can be used to increase long term supplies, through voluntary agricultural land retirement. Whatever the merits of retiring a given piece of agricultural land, tools targeted at average supplies and dry year reliability have very different effects.

As discussed in section 3, many strategies could provide increased predictability in dry years. As CALFED further develops these strategies, it should develop an approach that provides adequate evaluation and measurement of the access which individual water users and districts have to strategies to improve reliability during dry years.

3. Assure that the water supply reliability program actively promotes CALFED's ecosystem restoration goals.

It is essential that CALFED recognize the water supply reliability benefits of achieving its ecosystem restoration objectives. The recovery of endangered species, for example, would dramatically increase the predictability of water supplies. In addition, CALFED's water supply reliability program must support -- rather than compete with -- the flow improvements necessary to achieve the ecosystem restoration objectives. In short, CALFED's water supply reliability program must do more than simply reduce environmental impacts (as stated in the current CALFED definition). It must be fully integrated with the ecosystem restoration program. Such an approach will better serve both the environment and water users.

This has significant ramifications for the water supply reliability objective. For example, increasing operational flexibility for consumptive uses without also using that flexibility to meet the objectives of the ecosystem restoration program is likely to result in further environmental degradation, thereby reducing reliability. CALFED's water supply reliability program must provide reliability for the environment, not merely for water users. It is now widely accepted that the attainment of water supply reliability and ecosystem restoration are inextricably linked; this linkage must be formally recognized in the objectives that guide CALFED.

CALFED can evaluate progress towards this reliability objective by measuring specific contributions to the attainment of objectives for endangered species recovery, desired annual hydrograph, in-stream flow improvements, and other components of the CALFED ecosystem restoration program. Attainment of these objectives will result in increased reliability for all water users.

It is important to note, however, that unpredictability of water supplies which results from slow progress in attaining ecosystem restoration goals should not be used as a rationale for reducing ecosystem restoration funding, or for constructing new surface storage facilities which could result in further ecosystem damage.

SECTION II: WATER SUPPLY IN CONTEXT

CALFED's water supply reliability program is being driven in part by flawed notions about what current and future demand for consumptive use of water is and will be, and concern that environmental protections have had substantial impacts on agricultural and urban water users. Indeed, CALFED appears to be taking seriously claims that these relatively modest protections have caused actual water shortages. The purpose of this section is to provide historic context for current and projected water demand, and to provide an alternative perspective of the "water costs" associated with environmental protections by using actual Delta export data.

A. Historical Overview

In California's Central Valley watershed, developed water use has steadily increased over the last 150 years and has substantially reduced instream flows. In the San Francisco Bay/Delta the impacts of this development have been exacerbated by the export of much of the remaining freshwater inflow to the San Joaquin Valley, the Tulare basin and the Los Angeles basin. As these exports have increased over the last 30 years, the fishery populations have plummeted. Many aquatic species now qualify for Endangered Species Act (ESA) protections. Figure 1 summarizes the concurrent decline of fish populations along with increased Delta exports from 1967-1996.[2]

Over the 20-year period from 1975-1994, water users south of the Delta exported about 4.6 million acre-feet (AF) on average. However, exports steadily increased over this time frame reaching a record high of 6.1 million AF in 1989, notwithstanding a series of very dry years in the late 1980s and early 1990s. Indeed, total Delta outflow was less than 35 percent of estimated unimpaired flows for four straight years 1988-1991.[3]

State and federal governments began to consider and implement environmental protections under the CVPIA, the federal and state clean water acts and endangered species statues in the early 1990s. Various studies have been generated purporting to demonstrate that these limited environmental protections have had, and will have in the future, enormous water supply impacts. Recent claims have been over 2 million acre feet per year.

However, it is essential that the CALFED solution be based on clear and accurate information. Close analysis reveals that the water supply impacts of environmental protection are relatively modest -- certainly no more than the water users felt was reasonable when they signed the Bay-Delta Accord four years ago. We base this conclusion on the tables 2 and 3 of this section. These tables analyze the impact on Delta

[2] DWR's DAYFLOW database is the source of all Delta export and outflow values in this Appendix. CDFG's data for fish passage at Red Bluff are used for population values for salmonids and steelhead. Midwater trawl data is used for population values for Delta smelt, longfin smelt and striped bass.

[3] Unimpaired flow data provided by DWR.

exports of environmental protections against two different baselines; actual exports and a modeled projection of exports assuming a 1995 level of demand and the D-1485 standards.

The water supply "impacts" of environmental protections are correctly characterized as "the loss of historic supplies to consumptive users." Thus, the best way to define the baseline for determining such impacts is actual historic export levels.[4] Comparing projected operations under environmental protections with exports that have actually taken place provides the most realistic assessment of potential impacts. Nevertheless, we have included here analyses of water supply impacts associated with environmental protections using both historic (actual) data and DWR's projected future definition of baseline. We have compared these two baselines with the same regulatory regime -- the current environmental protections afforded by the CVPIA, the 1995 Water Quality Control Plan and ESA criteria. Results of this comparison are illustrated in tables 2 and 3.

Table 2
Delta Export Comparison
Baseline: Actual Exports
(all values in TAF)

	Baseline: Actual Exports	Current Regulatory Conditions: Projected Exports under ESA, WQCP, CVPIA (DWRSIM Study 549new)	
Period	Average	Average	Difference from Actual
October 1975 - September 1994	4596	5297	701
June 1986 - September 1992	4979	4328	-651

Table 3
Delta Export Comparison
Baseline: DWRSIM D1485 Study
(all values in TAF)

	Baseline: Projected Exports Under D1485 (DWRSIM Study 693)	Current Regulatory Conditions: Projected Exports under ESA, WQCP, CVPIA (DWRSIM Study 549new)	
Period	Average	Average	Difference from Actual
October 1975 - September 1994	5843	5297	-547
June 1986 - September 1992	5257	4328	-929

[4] South of Delta deliveries are sometimes used to estimate impacts in place of Delta exports.

Table 2 looks at projected levels of export under the current environmental protections compared with actual historic exports. Historic annual exports from the Delta were about 4.6 million AF on average (1975-1994). The current relatively limited environmental protections have not resulted in major adverse impacts on historic levels of export. On the contrary, with current environmental protections in place, under a repeat of the 1975-1994 conditions, Delta exports would be about 5.3 million AF -- or about 700,000 AF more per year than the water users actually exported on average.

Nor is it the case that current environmental protections would result in unreasonable impacts during prolonged drought periods. Table 2 demonstrates that during the most recent prolonged drought period (June 1986-September 1992), actual Delta exports were about 4.97 million AF. During a repeat of these conditions, with the current environmental protections in place, south of Delta exports would be about 4.3 million, or a decrease in annual average exports of about 650 TAF. While this is not an insignificant amount, it is well below estimates of the water costs associated with environmental protections. Even more significantly, it is well below what the water users themselves determined was "reasonable" when they signed the Bay-Delta Accord four years ago.

Table 3 looks at these water costs using a different baseline -- an entirely hypothetical modeling projection that does not reflect exports ever provided to south of Delta exporters. As discussed above, DWR has assessed the "impact" of environmental protections using a baseline that assumes a 1995 level of demand and the D-1485 standards. (We emphasize that we are aware of no justification or support for the notion that this level of demand somehow represents an absolute entitlement such that any level of export below this level counts as an "impact".) Nevertheless, even under this questionable baseline, projected water costs of current environmental protections is far below many water user claims. On average, DWR's study demonstrates that under its hypothetical baseline Delta exports would be about 5.8 MAF annually. With environmental protections in place, projected exports would decrease by about 547 TAF -- or less than 10%. In a repeat of a lengthy drought, exports could decrease from 5.2 MAF to 4.3 MAF, or about 929 TAF.

We do not discount the significance of this drought period estimate. However, this worst case scenario is again well below the highly inflated claims that are routinely employed in the CALFED process to justify immediate construction of new dams and surface reservoirs -- and again below the level of impact the water users agreed to in signing the Bay-Delta Accord. It is worth noting that the environmental criteria reflected in these DWR studies include a broader ranger of protections than those used for purposes of the Bay-Delta Accord "impact" modeling. Thus, it now appears that the combined water supply impact of the ESA, CVPIA and Water Quality Control Plan protections is somewhat **less** than the anticipated water costs of the Bay-Delta Accord alone. If nothing else, this fact indicates that CALFED must use great caution in premising its water supply

reliability program on modeled projections and any such studies must receive careful and comprehensive review.

Additionally, it is critical to acknowledge that the limited water supply impacts of current (critically needed) environmental protections have not resulted in water shortages. When subsidized water has been less than fully available, the water users have been able to avail themselves of water on the open market. For example, during the drought of the late 1980's and early 1990's, Westlands Water District secured additional water supplies through many of the water supply reliability tools analyzed in Section 3, including water transfers and improved water conservation practices. Over the five year period from 1990 to 1994, despite reductions in the amount of federally subsidized water it received, Westlands was able to adapt and maintain very productive crop yields and gross crop values. Given the existence of adequate tools that we propose, water users will have substantially improved access to water.

In other words, even in dry years, the water users have not lost water supply -- they have simply experienced reductions in water subsidies. As discussed further in section 2, this is appropriate public policy because it will encourage more efficient use of water. A healthy and appropriate water transfer market, as well as the other tools discussed in Section 3 will mean that what the water users may lose in subsidies they will more than make up in increased reliability.

Finally, not every reduction in water supply, or the availability of subsidized water, can be laid at the door of environmental protection. Under California's appropriative rights system, in some years drier weather alone will trigger shortages for those districts that have the most junior status, even though other more senior water users will receive full contract supplies.

B. Overestimating Current and Future Demand

The assumptions used by CALFED to estimate urban water demand are based on questionable projections from DWR's Bulletin 160-98 which dramatically overestimate current and projected demands for consumptive use, and underestimate savings from current and projected water conservation strategies. Among the program's faulty assumptions:

- Current water demand is overstated by up to 1.2 million acre-feet. Demand projections for 2020 are based on this inaccurate baseline.

- Errors in forecasting methodology underestimate water availability by hundreds of thousands of acre-feet.

- 2020 urban demand is overstated by an additional one million acre feet because of the failure to include all applied water reductions as reductions in future demand.

In light of these problems, CALFED should also reevaluate its assumptions regarding agricultural water demand before proceeding with further analysis. In all cases, demand responsiveness to price, must be fully integrated into the supply/demand assessment, upon which CALFED's assessments are based.

Figure 1(a)
Historic Delta Exports and Fish Populations
(population data available only since 1967)

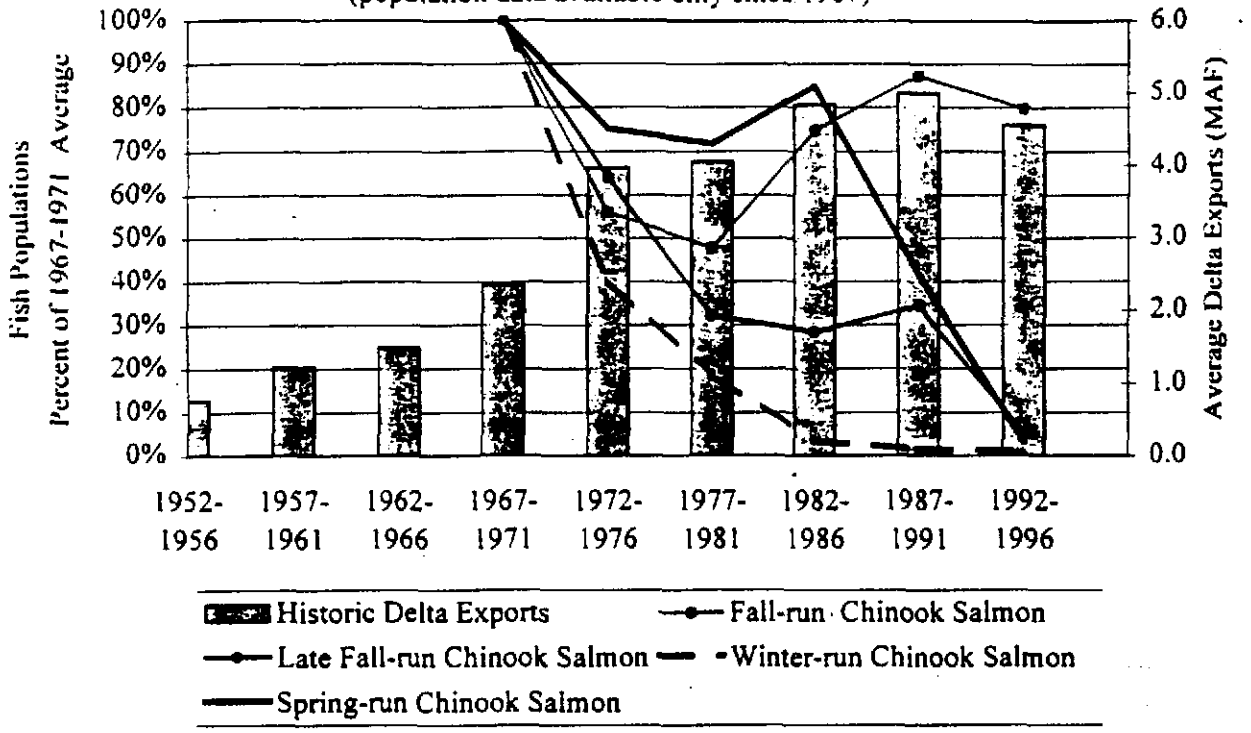
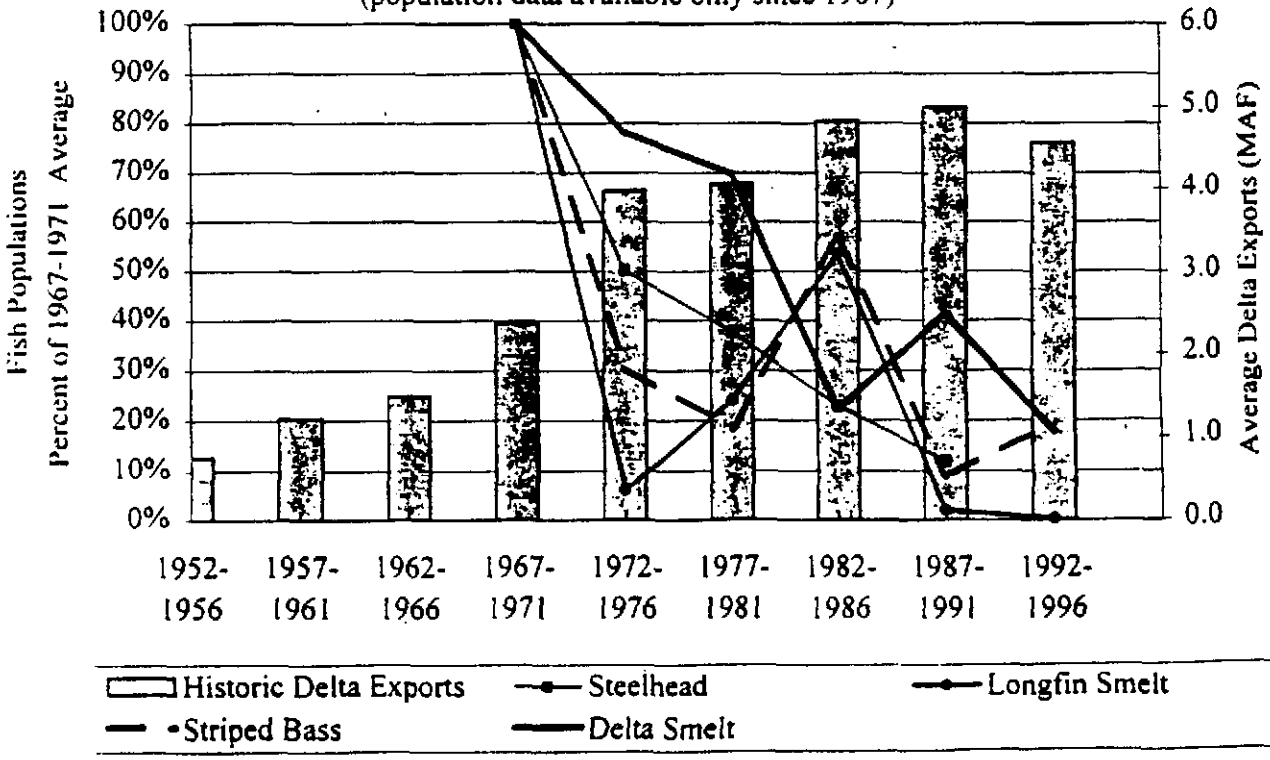


Figure 1(b)
Historic Delta Exports and Fish Populations
(population data available only since 1967)



SECTION III: ACHIEVING WATER SUPPLY RELIABILITY WITHOUT NEW DAMS

CALFED has not adequately analyzed the potential for alternatives to new dams and surface reservoirs to provide water supply reliability. This section initiates a fuller discussion of these options. The analysis below is preliminary and is based on the limited data available to our organizations. The figures provided are a rough approximation of the water supply that could be saved or made available through "soft path" means and other approaches compatible with ecosystem restoration.

This analysis is not a definitive or exhaustive discussion, but should provide the CALFED Policy Group and staff with a starting point. Clearly a thorough investigation of the issues raised in this section must be conducted before CALFED commits itself any further to a "presumption" that new surface reservoirs are required to attain the water supply reliability objective. We have not, for example, performed an economic analysis of these alternatives. We continue to urge CALFED to complete such an analysis before making decisions regarding the need for new storage and conveyance projects. We believe that the results of this analysis will demonstrate that the strategies outlined below provide the basis for an environmentally and economically sound water supply reliability program. We further believe relying on the diverse mix of water management tools discussed below will reduce system vulnerability, as well as reduce the risk that CALFED will create stranded assets by constructing expensive facilities to which cheaper alternatives exist.

In the future, we will present our recommendations for the CALFED water quality and system vulnerability programs. The measures discussed below will comprise one part of our water quality recommendations, as we believe that implementation of these measures, such as improved agricultural irrigation efficiency, voluntary land retirement, watershed restoration and water reclamation, can offer substantial water quality benefits. In addition, as we have previously recommended, implementation of measures to address Delta subsidence can reduce system vulnerability and improve water supply reliability.

The discussion below is divided into four subsections. First, we discuss the need for a foundation of baseline information and appropriate financing tools for a water supply reliability program. Second, we discuss demand strategies to better utilize existing developed water supplies. Third, we address "supply side" strategies which could be conditioned to provide water supply benefits for urban and agricultural water users, as well as the environment. Fourth, we discuss some of the flow-related ecosystem requirements which the water supply reliability program must address. We believe that implementation of the CALFED water supply reliability program, particularly the "supply side" strategies discussed below, must be formally linked with assurances that ecosystem flow and other requirements will be provided. Specifically, the environment should benefit directly from the implementation of each water supply reliability tool discussed below. We propose the following package of potential strategies:

A. A Water Supply Reliability Foundation

A solid foundation of reliable information and financing is a key to the ultimate success of the CALFED water supply reliability program.

1. Developing a Baseline and a Water Budget

CALFED should develop and implement a comprehensive budget for use of the Bay-Delta's waters. Exports and diversions from the system have increased over time, and, the total amount of withdrawals and depletions has not been adequately measured. Such a budget would provide the comprehensive information needed to make well-informed decisions. It could also promote ecosystem restoration and sustainable economic use. Such a budget will require an accurate and comprehensive water use measurement and reporting program.

2. Modeling Assumptions

The modeling for CALFED's "no action" alternative assumes that the CVP and the SWP will make full deliveries of contracted supplies in the future. As discussed above, such deliveries would be inconsistent with existing law (e.g. ESA, CWA, CVPIA), CALFED's ecosystem restoration goals and "no redirected impacts" principle. By building these increased deliveries into the "no action" alternative, the modeling masks the potential environmental impacts of CALFED's water supply reliability alternatives. Correcting this assumption is essential for CALFED to weigh accurately the benefits and impacts of a final CALFED package. In addition, correcting this assumption is essential to comply with CALFED's commitment not to balance the state water budget on the back of the Delta.

3. Financing and Pricing

Past water pricing policies have consistently understated the "true cost" of water development through financial subsidies and by failing to assign economic cost to ecosystem destruction. These policies have combined to inflate expectations, create a perception of shortages and encourage environmentally damaging water development.

To avoid such problems in the future, CALFED should adopt a comprehensive pricing strategy that ensures that all water supply alternatives incorporate in full their associated economic and environmental costs. In particular, direct beneficiaries should pay the full planning and construction cost of any new storage or conveyance facilities.

In addition, CALFED's financing package must address the unmet mitigation obligations of water users. This should include, for example, a set of surcharges on water use and development in the Bay-Delta system to assist in ecosystem restoration and the dedication of a share of any new water supply facilities to ecosystem restoration.

B. Demand-Related Strategies

1. Agricultural Water Conservation

Improve irrigation efficiency. Agriculture uses over 80% of the developed water supply in California. Relatively small changes in agricultural demand can yield tremendous quantities of water. For example, a small reduction in the percentage of applied water lost to evaporation by switching to more efficient technology, or by improved irrigation scheduling, can yield significant water savings.

Evaporative losses are irretrievable and a non-productive use of water. Flood irrigation is estimated to lose 20 to 30 percent to evaporation from open water surfaces and transpiration by weeds.[5] Evaporation losses from sprinkler systems, which are currently used on approximately 35 percent of the irrigated acreage in California,[6] are estimated to be as high as 9 percent, while micro-irrigation systems are estimated to have minimal evaporative losses.[7] Overall, a one to five percent reduction in agricultural demand due to reduction in evaporative losses or other changes in water use could generate 340,000 - 1,700,000 acre-feet.[8] These changes in irrigation practices could also have a substantial positive impact on water quality by reducing surface runoff and subsurface drainage.[9]

Increase use of market-based incentives. A voluntary program of compensated dry year fallowing of agricultural lands (dry year options) could generate a substantial dry year water supply. For example, dry year fallowing of 5 to 15 percent of the land currently used to grow alfalfa, pasture forage and cotton in the Central Valley and Colorado River regions could potentially generate 400,000 to 1.2 million acre-feet in those years.[10] These reductions are based on evapotranspiration rates and constitute reduction in consumptive use. Reductions in the volume of applied water are even greater, yielding additional environmental benefits. The CVPIA Least Cost Yield study reached similar conclusions, finding that 1.24 million acre feet of non-CVP consumptive use could become available through voluntary land fallowing "capped" at 20 percent of existing use in the Central Valley. Estimated costs range from $55 to $255 per acre foot.[11] The same report found that 300,000 acre-feet could be made available within the CVP service area. Applying

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[5] Peter Gleick et al, *Review of the CALFED Water Use Efficiency Program Technical Appendix* (Pacific Institute for Studies in Development, Environment and Security, Oakland: 1998) p. 20.

[6] David Sunding, et al., "The Costs of Reallocating Water From Agriculture,: University of California, Berkeley, 1994.

[7] Greg Young and Steve Hatchett, "On-Farm Irrigation System Management," Technical Memorandum, June 6, 1994, p. 3-2.

[8] Based on 1995 average year agricultural water use, as reported in Bulletin 160-98, p. 1-20.

[9] Ronnie Cohen and Jennifer Curtis, *Agricultural Solutions: Improving Water Quality in California Through Water Conservation and Pesticide Reduction* (NRDC, San Francisco: 1998).

[10] This estimate was derived based on crop acreage by region from Bulletin 160-98, and average crop ET by region from Bulletin 160-93. The actual yield of dry year options must be adjusted to consider irrigation prior to the exercise of an option and potential dry year supply shortages.

[11] CVPIA Least Cost Yield Program, 1995.

the same methodology to the consumptively used portion of the Imperial Irrigation District's water supply would produce another 600,000 acre feet, for a total of up to 2,140,000 acre-feet. A reasonable minimum estimate of dry year fallowing can be obtained from the 1991 drought water bank. In that year, 420,000 acre-feet of "no irrigation" contracts (exclusive of "groundwater exchange and multiple response") were signed by DWR.[12]

Voluntary, compensated retirement of marginal quality lands on the west side of the San Joaquin Valley will have multiple benefits that could help meet the CALFED objectives in many areas, including water quality, water supply reliability, and ecosystem restoration. CALFED's preliminary analysis showed that a voluntary program of compensated land retirement could generate as much as 1.5 million acre-feet of water at an average cost of $150 per acre foot. This cost is significantly less than the projected costs of many other water supply augmentation options currently under consideration.

The 1990 joint federal-state "Rainbow Report" forecast that, by 2040, 460,000 acres of San Joaquin Valley lands would be significantly drainage impaired.[13] It recommended a suite of actions, including land retirement, in its drainage management plan. Even assuming the full accomplishment of the other measures, such as conservation and reduction of deep percolation, the Rainbow Report recommended that 75,000 acres be retired from willing sellers. Assuming an average allocation of 2.5 acre-feet per acre, and assuming that .5 acre-feet per acre is necessary for subsequent land management activities, retiring this amount of land from willing sellers could generate 150,000 acre-feet of water. Voluntary retirement of 75,000 acres is projected to occur pursuant to the CVPIA, even in the absence of a CALFED solution. Voluntary land retirement above this amount can further contribute to the CALFED solution.

These figures are preliminary only, and provided here for illustrative purposes. The degree to which market-based voluntary dry year fallowing and voluntary land retirement should be implemented, and under what conditions, deserves far more exhaustive analysis than CALFED has undertaken to date. CALFED must conduct a serious examination of these options.

2. Urban Water Conservation

The urban element of the CALFED water use efficiency program is based largely on full implementation of the Memorandum of Understanding Regarding Urban Water Conservation (MOU) – which is expected to generate 1.5 million acre feet of demand reduction by 2020.[14] While the CALFED documents recognize that implementation of

[12] "California's 1991 Drought Water Bank: Economic Impacts in Selling Regions," (Rand, 1993).
[13] San Joaquin Valley Drainage Program, 1990. *Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley*, U.S. Department of Interior and California Resources Agency, Sacramento, California.
[14] Department of Water Resources, Bulletin 160-98: The California Water Plan Update, (Sacramento: 1998) p.4-16.

the MOU should comprise the "floor" or base level of conservation, rather than a ceiling, the CALFED program makes little effort to quantify, let alone pursue, the substantial conservation savings that exist above the level to be obtained by full implementation of the MOU. Some of the available savings are described below.

Promote low water use landscaping and more efficient irrigation. Landscaping represents 30 to 60 percent of urban water use water use.[15] According to CALFED, urban water use amounts to 8.7 million acre-feet. Total water use for landscape purposes therefore ranges from 2.6 to 5.2 million acre feet. Landscape water audits, timers, and xeriscape could reduce landscape water use by approximately 10 to 15 percent. Greywater systems or rain cisterns can conserve much or all of landscape water use in individual applications. Statewide, a 20% reduction in landscape water use would yield 520,000-1,400,000 acre-feet.[16] Because the Urban MOU targets a limited number of customers for landscape water audits, even full implementation of the MOU will generate only a small portion of these total potential savings from landscape conservation.

Retrofit homes with more efficient washing machines. Replacing 50 to 100 percent of the average washing machines in use in 1995 with currently available horizontal axis washing machines could generate 97,000 to 194,000 acre-feet.[17] Future savings could increase further as even more efficient models come on the market. Because a BMP for horizontal axis washing machines was only recently added to the MOU, these potential savings are not yet reflected CALFED's estimates of potential urban water conservation savings.

Retrofit businesses and institutions with commercial Ultra Low Flow Toilets (ULFTs). According to a 1997 study by the Urban Water Conservation Council, savings from commercial ULFT retrofits ranged from 16 to 57 gallons per day (gpd), with wholesale establishments saving 57 gpd, and food stores and restaurants saving approximately 48 gpd.[18] Statewide savings from retrofits could yield 200,000 acre-feet, assuming that 5 million retrofits occur with average savings of 35 gpd.

Implement existing BMPs for residential indoor use at levels above MOU specifications. A substantial additional increment of cost-effective conservation is achievable by implementing existing BMPs above the levels specified in the Urban Water Conservation MOU. For example, potential savings from 4 indoor residential measures alone (ULFTs,

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[15] DWR Bulletin 160-93 notes that residential outdoor use ranges from 30 to 60% (p. 153) DWR Bulletin 166-4, *Urban Water Use in California*, notes that urban seasonal water use ranges from 26% to 58%. (p.24) Bulletin 166-4 notes that while some seasonal water use is not due to landscape use, this is offset by the fact that some landscape water use occurs year round. Therefore, seasonal use is a reasonable approximation for landscape use.

[16] Benefits to the Delta may be somewhat lower than that since some portion of applied landscape water may return to the system for future use.

[17] Gleick, et al., Appendix B.

[18] Hagler Bailly Services, Inc., *The CII ULFT Savings Study*, (San Francisco: 1997) Sponsored by the California Urban Water Conservation Council

showerheads, faucet aerators, and leak detection) could yield over 300,000 acre-feet.[19]

Implement existing BMPs for commercial, industrial and institutional water use at levels above MOU specifications. Additional savings are also possible from commercial, institutional, and industrial (CII) water conservation efforts above MOU specified levels. CII use represents almost 40% of urban water use, or almost 3.5 million acre feet. Recent studies estimate potential cost-effective savings of 20 to 30%,[20] which corresponds to statewide savings of 700,000 to 1 million acre feet. Full implementation of the CII BMP should capture 350,000 acre feet, leaving at least 350,000 to 650,000 of cost-effective savings available.

3. Water Acquisitions and Transfers

California already has an enormous developed water supply, much of which is currentl: used in a highly inefficient manner. In addition, California's rigid and inflexible system for allocating available supplies according to seniority exacerbates water management problems in the over-allocated Bay-Delta system. Thus, relatively small periodic "shortfalls" can, and do, fall disproportionately on particular users. In such a seniority-based system, where the marginal cost of developing "new" supplies is high and the marginal benefit of the least productive water uses is low, voluntary transfers between consumptive users offer potentially significant economic and water supply reliability benefits to individual water users and the state as a whole. They can also be used to address our over-allocation problem directly, and to provide a cost-effective and flexible suite of approaches for helping to secure and sustain improved ecosystem flows. Finally, transfers have the potential to provide significant near-term and dry year benefits, making them particularly appropriate for a major effort in CALFED's Stage 1.

Many other demand side strategies discussed in this section offer the potential for real water savings. However, water users will resist more stringent regulatory requirements to achieve these savings, and taxpayers are likely to resist a new generation of water development subsidies. Market-oriented transfers offer an important third path to encourage increasingly efficient use of our existing water supplies.

If transfers are conducted in an irresponsible manner, they have the potential to harm local communities and the environment, both in the Delta and in upstream regions. A variety of mechanisms can assure adequate protection for all legitimate interests and ensure that proposed transfers and acquisitions make sense as part of a more comprehensive and sustainable long-term water management framework. A full discussion of relevant assurance mechanisms is beyond the scope of this document, and will de addressed subsequently. However, measures which will be needed to facilitate the development of a more active market include:

[19] Gleick et al., p.35.

[20] Gleick et al, p. 32, citing J. Sweeten and B. Chaput, (1997), "*Identifying the Conservation Opportunities* in the Commercial, Industrial, and Institutional Sector"; U.S. EPA, (1997) "Study of Potential Water Efficiency Improvements in Commercial Businesses".

- Comprehensive metering and/or equivalent measurement of "flows" of surface and groundwater into and out of the Bay-Delta system;

- A robust and comprehensive regulatory/operational surface water baseline sufficient to protect all affected public trust resources;

- A comprehensive set of basin-specific sustained yield groundwater management programs which fully protect groundwater and related aquatic and terrestrial ecosystems;

- A system for converting the above baseline and any permanently acquired ecosystem supplies into a system of permanent ecosystem rights, and for securing and tracking acquired "temporary" supplies;

- Secure and sufficient ecosystem funding;

- A proactive water transfers clearinghouse, including use of a statewide electronic bulletin board and other mechanisms;

- Strategies to facilitate meaningful community involvement;

- Water use and transfer mitigation surcharges to fund mitigation and retraining programs for members of affected local economies; and

- The adoption of measures to resolve disputes between water users, retailers and wholesalers (such as direct buy-back programs, thresholds for out-of-area transfers, or other means).

With these protections in place, an expanded market between consumptive users would allow "water short" agricultural and urban areas to purchase water from "water rich" agricultural areas, encouraging overall water use efficiency. Such a market could also induce source regions to more effectively and sustainably manage their groundwater basins for multiple benefits. But perhaps the greatest incentive to further development of a consumptive-use water transfer market would be the elimination of all subsidies for any "new" water development.

A primary objective of a more flexible, market-oriented approach to allocating available supplies should be to "re-acquire" developed water supplies to improve ecosystem protections. A voluntary, willing-seller environmental "re-acquisition" program would augment existing regulatory requirements (CVPIA, ESA and 1995 WQCP). It would also help match long-term restoration needs with variable geographic, biological and hydrological conditions by securing water rights and supplies to improve instream flows and Delta outflows.

Transfers and acquisitions should be implemented in ways which assure that there is no net increase in baseline diversions or consumption. In addition, CALFED's Stage 1 efforts should focus on facilitating increased "south-to-south" water transfer opportunities for consumptive use (including Colorado River region transfers) as well as Valley-wide ecosystem acquisitions. Subject to the above conditions, water transfers originating in upstream (above export) areas would be allowed, but limitations on through-Delta conveyance, necessary carriage water premiums, and the lesser amounts of developed water potentially available for transfer from above-export sources combine to suggest that "north to Golden Gate" acquisitions are a more cost-effective and likely result.

The primary mechanisms for acquiring environmental supplies and developing an active consumptive use water market include:

Direct acquisition of instream water rights: Water rights would be purchased from willing sellers and permanently transferred to environmental uses.

Re-operation of stored water: The purchase of stored water in existing hydropower reservoirs could be used to improve fishery flows and for riparian restoration and other ecosystem improvements.. Such purchases of stored water are not appropriate for consumptive uses, except as discussed below in Section III C 2(b) of this document.

Conservation-related investments: The water conserved through investments in improved conveyance efficiency, water saving irrigation technology, crop-mix changes, and other conservation-related investments should be shared between instream acquisitions and consumptive uses.

Voluntary land fallowing and land retirement: A huge water market could be created by transferring the consumptively used portion of water applied to some irrigated lands to the environment and other consumptive users. A mixture of drought options, short- and long-term leases, rotational fallowing, opportunistic ("spot") acquisitions, and permanent retirement, could result in millions of acre-feet of water savings per year in the Central Valley alone, as discussed above.

Groundwater transfers to instream/ecosystem use: Reducing surface water diversions during critical periods by relying on sustainable groundwater supplies could produce significant amounts of water for instream/ecosystem use.

Groundwater transfers to consumptive use: These transfers could become a significant source of consumptive use transfers over time, but should be strictly limited to previously banked groundwater supplies until shown to comply with a fully-protective, sustained-yield groundwater management plan.

The amount of water potentially available through the use of acquisitions and transfers is

discussed elsewhere in this section (e.g. groundwater, voluntary fallowing and land retirement, and agricultural conservation).

4. Wastewater Reclamation and Recycling

By the year 2020, according to CALFED, over 3 million acre-feet of wastewater will be generated annually by urban coastal areas. CALFED estimates that under a "no action" scenario California will recycle approximately half of this and generate 1.17 million acre-feet of reusable water[21]. Implementation of the CALFED water recycling program could generate from zero up to an additional 550,000 acre-feet in new supply, for total of up to 1,720,000 acre-feet in recycled supply.

Recycled water may be among the more expensive soft path alternatives. However, it offers important secondary benefits, including water quality benefits, and deferred or avoided costs for new or expanded wastewater treatment plants. Water reclamation is also one of the least controversial supply reliability measures.

While CALFED has identified the potential for creating up to 1.7 million acre feet of recycled water, it has not adopted that figure as an objective. Indeed, CALFED recognizes that the amount of new recycled water to be generated as a result of the CALFED program may only be zero.

C. Supply-Related Strategies

The strategies discussed in this section address the supply side of the water management equation. The environmental community has expressed grave concern about some of these measures because of the potential for additional serious impacts on an already devastated ecosystem. However, as part of a balanced CALFED water supply reliability program which also assures environmental water supply reliability (see Section III below), we believe that the measures identified below may have merit.

1. Groundwater Banking and Conjunctive Use

It is broadly recognized by CALFED, and among most stakeholders, that making better use of California's substantial groundwater resources offers potentially significant and cost-effective near- and long-term water supply reliability benefits for all.

Crafting and implementing an ambitious array of well-regulated groundwater storage and conjunctive management programs designed to achieve this potential should be the "supply side" focus and priority of an integrated and cost-effective Stage 1 water supply

[21] Reclamation is the exception to the "no new water" rule discussed in the introduction, as it actually does create "new" water. CALFED defines "new" water generated by reclamation as that which would otherwise be lost to consumptive use. Currently, some "unreclaimed" waste water is returned to streams and reused by downstream users. (CALFED EIR/EIS Water Use Efficiency Water Use Efficiency Component p. 1.4)

reliability strategy. As discussed further in section III B 3. necessary protections and assurances will include comprehensive groundwater monitoring as well as basin-specific sustained-yield management. Developing the institutional and legal arrangements needed to protect recharged groundwater supplies for later withdrawal is a necessary condition to successful groundwater development that would also greatly increase the incentives for implementing such programs.

The potential for groundwater banking varies according to many factors, including (1) aquifer storage capacities, (2) the relationship between groundwater levels and ecosystem needs, (3) the use of groundwater pumping to support local economic activities, (4) the source of water to be banked, and (5) the ability to convey water both to and from a particular recharge site.

Such programs will require the development of local conveyance systems, active recharge sites, extraction wells, and other local infrastructure. Nevertheless, they can be implemented in ways that provide enhanced reliability benefits for all sectors without adding pressure to an already-oversubscribed Bay-Delta system if (1) they are based on a truly comprehensive management regime, and (2) are structured to look beyond so-called "surplus" water – water which may be available for diversion or export after an improved ecosystem baseline is firmly in place – to include a diversity of alternative sources (transferred and acquired supplies, "self-savings" derived from baseline allocations, drawdowns of existing reservoir supplies, etc.).

A reservoir drawdown program illustrates the potential. In many years, a portion of the water scheduled to be carried over in existing surface reservoirs could be released and stored in aquifers through percolation or injection, or supplied directly to users otherwise dependent on groundwater (so called "in lieu" recharge). During the ensuing rainy season, these reservoirs would be able to capture additional surface runoff, thereby replacing the water previously released for storage in a groundwater bank. (In the event that "refill" did not occur, previously banked supplies and/or previously-agreed upon risk-compensation payments could be used to help to make ends meet.) While this approach is not without potential complications, studies indicate that it could result in as much as 1 million acre-feet of additional "yield" becoming available, even after factoring in the need to meet instream flow, temperature criteria, and other environmental and water management constraints.[22]

Other studies demonstrate that these and related programs are both cost effective and dramatic in their potential to address California's water management needs. For example, the CVPIA Least Cost Yield Plan estimates that active groundwater recharge programs could produce approximately 940,000 acre feet of yield per year, with costs ranging from as little as $60-$120 per acre foot. While these costs can be expected to increase as "market-based" or "self saving" source-water elements are included, they continue to show great promise in comparison other supply-oriented alternatives.

[22] NHI, 1998. An Environmentally Optimal Solution: A Response to the CALFED Bay Delta Program.

2. Changing the Operation of Existing Reservoirs.

Throughout California, more than 4,000 existing dams and reservoirs involving more than 60 million acre feet of combined storage capacity are operated according to rules and criteria that have developed in piecemeal fashion over the course of many decades. As the preceding section suggests, relatively modest changes in operations that are coordinated and integrated with other CALFED options can do much to improve water supply reliability for all beneficial uses. Before rushing to build costly new dams and reservoirs, a comprehensive re-assessment of integrated re-operation opportunities is needed in at least the following areas:

(a) Floodway Restoration and Changes in Flood Reservation: Operators of most major Central Valley reservoirs currently set aside reservoir capacity to capture flood flows in order to protect downstream property and lives. This flood reservation, in effect, reduces potential annual carryover storage of water supplies by requiring that a certain amount of reservoir space be kept empty.

Total downstream flood protection is the sum of vacated storage behind the dam and the amount of water than can be released in any given period of high runoff. Annual carryover storage -- and thus water supply reliability -- could be significantly increased if dam operators were allowed, in appropriate circumstances, to decrease the total flood reservation space behind the dam. There are three basic, and often necessarily integrated, approaches to responsibly increasing water storage and subsequent yield, without compromising important flood control functions:

- Develop more sophisticated reservoir rule curves that incorporate forecast-based release operations and integrated reservoir operations. Such operations would allow both conditional encroachment of existing flood control reservations as well as encourage larger temporary reservations as meteorological conditions dictate.

- Increase dam outlet capacity where outlet constraints limit effective use of downstream floodways and reservoir flood control reservations.

- Increase floodway capacity and the ability to safely inundate floodplains if floodways prove insufficient to handle foreseeable flood flows.

In this context, floodway and floodplain capacity restoration would include: wider floodways; purchase of land or easements on lands that would flood by design; increased protection where needed, such as localized ring levees, for sensitive infrastructure or communities; and other options for getting, and/or keeping, people "out of harm's way."

Increasing the frequency and size of moderate flood events, concurrently with other actions to restore floodways is already a central part of the CALFED ecosystem

restoration program. In addition to facilitating the attainment of ecosystem objectives, this approach would provide the added water supply reliability benefit of augmenting storage in existing reservoirs. It is important to note that this approach would not affect the size or frequency of large floods, as it would not reduce the total flood reservation.

CALFED should evaluate the potential for increasing annual carryover storage by increasing allowable controlled releases from Central Valley dams as floodways are restored, thereby reducing the amount of reservation necessary behind each dam. For example, analysis of operations at Friant Dam indicate that alterations in the flood reservation regime could increase carryover storage on the San Joaquin River by approximately 5 to 10 percent.[23] Assuming that altering the flood reservation regime at other major terminal reservoirs could increase storage by 2-3 percent, this measure could increase annual storage in the Central Valley by a minimum of 400,000 to 600,000 acre feet. The actual increase in the amount of water captured and stored from this operational change can only be estimated through additional site-specific modeling analyses. However, a comparable small percentage increase in available carryover storage at most major reservoirs has the potential to significantly improve water supply reliability Valley-wide, particularly in dry years following wet years.

(b) Reoperating Hydropower Reservoirs: The non-consumptive water storage rights in existing hydropower reservoirs (up to 3.2 million acre-feet of combined capacity) can potentially be purchased and utilized for a variety of reliability purposes. For example, a portion of the flood-reservation burden discussed above could be transferred to acquired hydropower storage capacity. Upstream hydro-storage capacity could also be used to re-regulate acquired instream supplies, including acquired storage rights, ensuring that purchased flow improvements are available when and where needed. The purchase and transfer of non-consumptive storage rights to consumptive purposes may be appropriate for upstream (area of origin) communities if implemented in conjunction with environmentally restorative actions and if offset by equivalent reductions in exports of "surplus" water (i.e., water surplus to the needs of area of origin communities and ecosystem resources.) Given the scope and direction of the electric utility industry restructuring currently underway, a comprehensive evaluation of all such opportunities should be a critical focus of CALFED's Stage 1 efforts.

(c) Environmental Water Banking. It has been a long-standing practice in the federal CVP to "reschedule" allocated water from one year to the next. Such informal "banking" of unused allocations has never been available to ecosystem resources, even though it was affirmatively authorized "for drought protection and other purposes" in conjunction with the dedication of ecosystem supplies under the 1992 CVPIA (section 3408(d)). One need look no farther than across the Sierra Nevada crest to see how the Truckee River Operating Agreement is using reservoir banking and a market-based acquisition program to facilitate improvements for all involved. Developing and implementing similar programs throughout the Central Valley should be another focus of CALFED's Stage 1

[23] NHI, 1998. An Environmentally Optimal Alternative: A Response to the CALFED Bay Delta Program.

efforts.

3. Restore Upper Watersheds

Watershed restoration to increase water infiltration and retention will increase surface and groundwater yields in dry seasons and years, particularly in undammed watersheds. Watershed restoration would provide the added benefits of improving ecosystem conditions and attenuating flood peaks. Loss of existing reservoir storage capacity from sedimentation due to erosion in the upper watersheds could also be stemmed through commitment to a significant and well-funded watershed restoration program. Although measurable water supply benefits from watershed restoration will take several years to accrue, they could prove to be particularly valuable in the event of prolonged drought or a shift in the rain to snow ratio resulting from predicted global warming. At this time, there is not enough information or analysis to calculate the magnitude of increased yields from watershed restoration, but the promise of this approach warrants more examination of this approach.

4. *Changes in Delta Operations*

We recognize that certain changes in Delta operations and construction of certain facilities could provide increased supplies for consumptive uses of water. However, such reoperations and facilities could also exacerbate ecosystem harm. We support the approach that is now being developed by the DEFT and "No Name" groups to integrate fully planning for water supply flexibility tools with increased environmental protections in the Delta. There appears to be reason for optimism that water supply reliability for consumptive uses can be increased while promoting ecosystem health.

CALFED's proposal to explore modifications that would provide greater operational flexibility including use of joint point of diversion, relaxation of COE criteria to allow increased SWP pumping capacity and construction of an intertie between the California Aqueduct and the Delta-Mendota Canal should be evaluated only within the framework of new criteria for biological protection. Otherwise, the use of these tools and facilities could potentially undermine CALFED's ecosystem restoration objectives and off-set biological benefits to fish species of concern (i.e., chinook salmon, steelhead trout, Delta smelt, and striped bass, and others). Assessment of these tools should not be limited to effects within the Delta, but should also include the expected effects of changes in reservoir operation on instream flows and riparian corridors.

In our view, implementation of the operational flexibility measures under consideration by CALFED should be bound by the following express conditions:

(a) All baseline regulatory requirements (the 1995 WQCP, the CVPIA and current ESA protections) are implemented in full;

(b) All additional biological protections proposed for Stage 1 by EWC (see below) and

required for future compliance with state and federal environmental laws be implemented in full; and

(c) Assurances are in place guaranteeing that operational changes will conform with the criteria listed in 1 and 2 above and will enable the public to enforce these conditions.[24]

D. Flow-Related Ecosystem Needs

As discussed in Section 1, CALFED's water supply reliability program must do more than provide reliability for consumptive use -- it must also provide reliability for the environment. This reaches beyond mitigation for adverse impacts related to consumptive use of water and to the affirmative requirements of the ecosystem restoration program.

Restoring the Bay-Delta ecosystem, both upstream and in the Delta, will require water, as clearly indicated by the ERPP and DEFT discussions. That water must be provided by CALFED through its water supply reliability and other program elements. We believe the evidence demonstrates that CALFED can craft a program which provides significant water supply reliability benefits for both ecosystem restoration and urban and agricultural water users. Given the level of impacts from existing diversions, the long-term ecosystem needs are substantial. While it develops specific measures to meet these long-term needs, CALFED should begin by meeting the most urgent ecosystem needs during Stage 1 by implementing the actions outlined below.

1. Delta Flow-Related Improvements: Improvements in Delta operations are currently under discussion in the DEFT group. While these discussions continue to progress, our initial recommendation is that CALFED should implement the following biological protections in the Delta. These criteria represent ecosystem protection measures above and beyond the current level of protection provided by the 1995 WQCP, full implementation of the CVPIA and current ESA protections. Additional restrictions on exports during periods of significant biological concern are necessary given the status of many estuarine dependent species that are either listed or proposed for listing under the state or federal ESA's.

- April and May: Operations should be adjusted to provide increased Delta inflow from the San Joaquin River, and decreased exports, as specified in the VAMP study, during the entire months of April and May to provide increased protection of outmigrating San Joaquin chinook salmon and Delta smelt.

- November through January: Operations should be adjusted during the fall months to achieve a reduced export/inflow ratio (55% in November and 45% in December and

[24] For example, it may be necessary to establish a mechanism to bank a pre-determined amount of water (a portion of the yield of water supply tools such as joint point, groundwater storage, transfers and land retirement) to be called upon as necessary to reduce Delta exports and allow resource agencies to directly respond to biological problems at the export facilities.

January) to provide increased protection for spring run yearlings, and fall- and late-fall run fry emigrating through the Delta.

- February and March: Operations should be adjusted to provide increased Delta outflow in February and March, in dry years, to achieve X2 protection consistent with a 1962 level of development. This would provide an increase in protection for most estuarine and anadromous fish, particularly Delta smelt.

Potential impacts to Suisun Marsh from changes in Delta flow patterns have not been adequately evaluated or addressed. CALFED should develop and implement additional measures to protect and restore the biological diversity of Suisun Marsh.

2. Upstream Flow-Related Benefits: The ERPP, the AFRP and endangered species recovery plans all call for improved flow conditions in upstream areas, north and south of the Delta.. CALFED should continue to develop and implement these flow improvements during Stage 1, to provide improved habitat for species of concern and to achieve other CALFED ecosystem restoration goals.

3. Cap on Depletions and Diversions: We have elsewhere discussed the need for a state water budget. Establishing and implementing such a budget will require an adequate baseline, accurate measurement, a clear accounting methodology and, in our view, a cap on average annual diversions and depletions from the Bay-Delta system. Such a cap would offset capability to divert large amounts of water in wet years, with badly needed protections in dry years. This cap should be no higher than and, by the end of stage 1, should be lower than current levels.

SECTION IV: REVISED STAGE 1 ACTIONS FOR WATER SUPPLY RELIABILITY

Below are a limited set of preliminary recommendations intended to respond to the proposed Stage 1 recommendations in the August version of the draft "Developing a Preferred Alternative" document. As indicated below, some of these actions should be completed prior to Stage 1.

A. *A Foundation for Water Supply Reliability*

1. Prior to Stage I, CALFED should establish measurable objectives for each element of the water supply reliability program, including water conservation, recycling, and transfers.

2. Develop a water budget for the Bay-Delta system, including establishment of a registry of instream flows and more comprehensive measurement of withdrawals, depletions, diversions and exports for consumptive use.

3. Prior to Stage 1, develop realistic and accurate modeling assumptions regarding baseline water deliveries in the CALFED no action alternative.

4. Implement a surcharge on water use in the Bay-Delta system to fund the ecosystem restoration program.

5. Create a finance strategy to incorporate the full environmental and economic costs of water supply reliability strategies.

B. Demand Benefits

1. Measure all agricultural and urban water use.

2. Implement certification and enforcement program to ensure full implementation of the urban water conservation BMP's.

3. Capture conservation savings above full implementation of the Urban MOU. This should include implementation of the BMP's at a level that would capture all cost-effective savings, as well as implementation of cost-effective measures not yet included in the MOU.

4. Prior to Stage 1, develop performance standards for agricultural water use efficiency to measure progress towards program objectives, and an enforcement program comparable to the one proposed for urban water use.

5. Develop loan, grant and cost-sharing programs to increase local participation in urban and agricultural water conservation strategies.

6. Design and implement research programs/pilot programs to address remaining areas of uncertainty in water use efficiency. For example, conduct research on the relationship between evaporation and transpiration, and the potential for reducing irrecoverable losses through reductions in evaporation.

7. Prior to Stage 1, complete CALFED's economic marginal cost analysis of water management alternatives. Ensure that secondary benefits of "soft path" alternatives, including water quality, flood management, avoided drinking water and waste water treatment and capital costs, energy savings, etc. are fully reflected in this analysis.

8. Identify and then develop a program and plan to address legal and institutional barriers to water transfers, and improve use of existing infrastructure for transfers, as appropriate.

9. Develop and implement an appropriate set of assurances to provide protection to the environment and local economies from water transfers.

10. Encourage "south to south" transfers to meet consumptive use needs and "north-to-Golden Gate" and storage transfers to meet environmental needs.

11. Establish, fund and implement an environmental water acquisition program with at least an annual budget of $100 million to endow a drought year reserve fund and help meet long-term ecosystem restoration objectives. Performance measures to indicate successful implementation, in amounts of water, or the like, should be established prior to the initiation of Phase I and linked to other program elements.

12. Develop proposals for an institutionalized groundwater bank to facilitate transfers (see related recommendations below).

13. Develop best management practices for water recycling, including full evaluation of recycling opportunities, regional water recycling targets, and performance standards.

14. Develop loan, grant and cost-sharing programs to increase local participation in recycling strategies. Such programs should encourage regional efforts.

C. Supply Benefits

1. Develop an implementation framework for a comprehensive and properly regulated groundwater banking and conjunctive use program, including measurement of groundwater; designation of sustainable yield (maximum allowable while preserving aquifer capacity, ecological benefits and other values) for each groundwater basin; feasibility and cost studies; pilot projects; criteria for evaluation, permitting and operation of specific projects; statutory changes to address barriers to implementation; and construction of recharge, pumping and conveyance infrastructure. CALFED

should also develop loan, grant and cost-sharing programs to increase local participation in groundwater strategies.

2. Investigate and implement reservoir reoperation to utilize expanded floodways for all major reservoirs in the Central Valley.

3. Investigate and, as appropriate, implement the Delta reoperation strategies identified in Section III C, subject to the express environmental conditions set forth in Section III C and D. Develop appropriate assurance mechanisms.

4. Complete least cost and equivalency analyses, and develop willingness to pay formulas for potential new or expanded surface storage facilities. Require water users to pay the full planning costs for any such studies.

D. Flow Related Ecosystem Benefits

1. Implement the Delta flow improvement measures discussed in Section III D.

2. Develop and implement flow-related improvements for Suisun Marsh, upstream, riparian and floodplain restoration.

3. Develop and implement an environmental water banking program in groundwater and existing surface storage facilities, as authorized by the CVPIA.

4. Establish a cap on average annual withdrawals, depletions and diversions from the Bay Delta system which is no higher than current levels.

APPENDIX 1: PRELIMINARY MODELING RESULTS OF POTENTIAL CHANGES IN DELTA OPERATIONS

This appendix compares preliminary modeling projections of both export availability and ecosystem protection under our recommended Delta operating criteria to other management scenarios. These scenarios include:

1. Actual operations since 1975 (using information from the Dayflow database).

2. Projected operations complying with ESA requirements, the 1995 Water Quality Control Plan, and Interior's interim criteria for implementation of the CVPIA (DWR's DWRSIM study 549new).

3. Projected operations complying with the protective criteria described in Section 3 in addition to those described under (2) above (EWC DWRSIM study EBSSN-5).

4. Projected operations complying with the protective criteria described in Section 3 and including use of the joint point of diversion, the Interim South Delta Plan, and an intertie between the Delta Mendota and California aqueducts (EWC DWRSIM study EBSSN-6).

Table A1-1 compares total Delta exports under these scenarios for three periods, (1) the recent dry period from June 1986 until September 1992, (2) recent water years 1975-1994, and (3) the historic hydrology from 1922 until 1994. For the exports projected under studies EBSSN-5 and EBSSN-6, no assumption is made as to how this water is distributed after leaving the Delta for any of its possible uses, including delivery to export project urban and agricultural contractors, wildlife refuges or water bank to be used for environmental purposes. Figure A1-1 summarizes average Delta exports by month under each of the modeling studies.

Table A1-1 shows that, under the water management criteria recommended by EWC for implementation by CALFED in stage 1, average annual Delta exports are projected to be 395,000 acre-feet higher than those which actually took place under the recent historical hydrologic conditions from 1975 to 1994. It is not possible to compare actual to projected exports for the entire historic hydrology, since the Delta exports projects were not developed until the 1950s and 1960s. During a repeat of the very dry conditions between 1986 and 1992, which led to the most recent sharp decline in fisheries, however, average Delta exports under the EWC criteria are projected to be 774,000 acre-feet less than what actually occurred.

Preliminary modeling results suggest that the additional flows in the San Joaquin River can be achieved by allowing water to flow through tributary reservoirs during the April-May period. The average total flow increase of 52 TAF in April and May is offset, through reservoir reoperation, by a flow reduction of 49 TAF in other months. As a result of this reoperation, very little, if any, reduction in consumptive use would be required.

Figure A1-2 shows the projected average Delta inflow from the San Joaquin River during the April-May outmigration period for fall run salmon under each of the studies outlined above and compares these values to unimpaired flow estimates. Figure A1-3 shows the projected end-of-year storages for San Joaquin tributary reservoirs under each scenario. It is assumed that no releases from Friant Dam are made for fishery objectives.

Figure A1-4 shows how total exports would change under each of the modeling scenarios in December. In study EBSSN-5, exports would be curtailed in many years to protect winter-run and spring-run salmon. Study EBSSN-6 would also restrict December exports to protect these species, but would allow higher rates of export under wet conditions. Figure A1-5 shows the export inflow ratio for each of these scenarios in December.

Figures A1-6 and A1-7 show the projections under each scenario for total exports and the export-inflow ration in September, where scenarios EBSSN-5 and EBSSN-6 would allow a higher export-inflow ratio.

Figures A1-8 and A1-9 show the spring X2 position, in Critical and Dry years respectively, under each of the scenarios. The improvements in February and March in Dry and Critical years are due to the specific criteria recommended above. The improvements in April and May are due to the incremental protection provided by the extended export restriction during the April-May pulse period.

Table A1-1
Delta Export Comparison
(all values in TAF)

	Actual Historic Delta Exports	Study 549new		Study EBSSN-5		Study EBSSN-6	
Period	Average Exports	Average Exports	Difference from Actual	Average Exports	Difference from Actual	Average Exports	Difference from Actual
June 1986 - September 1992	4979	4328	651	4205	774	4342	636
October 1975 - September 1994	4596	5297	-700	4992	-395	5123	-527
October 1921 - September 1994	NA	5774	----	5402	----	5524	----

Figure A1-1
Delta Export Comparison
average of all years (1922-1994)

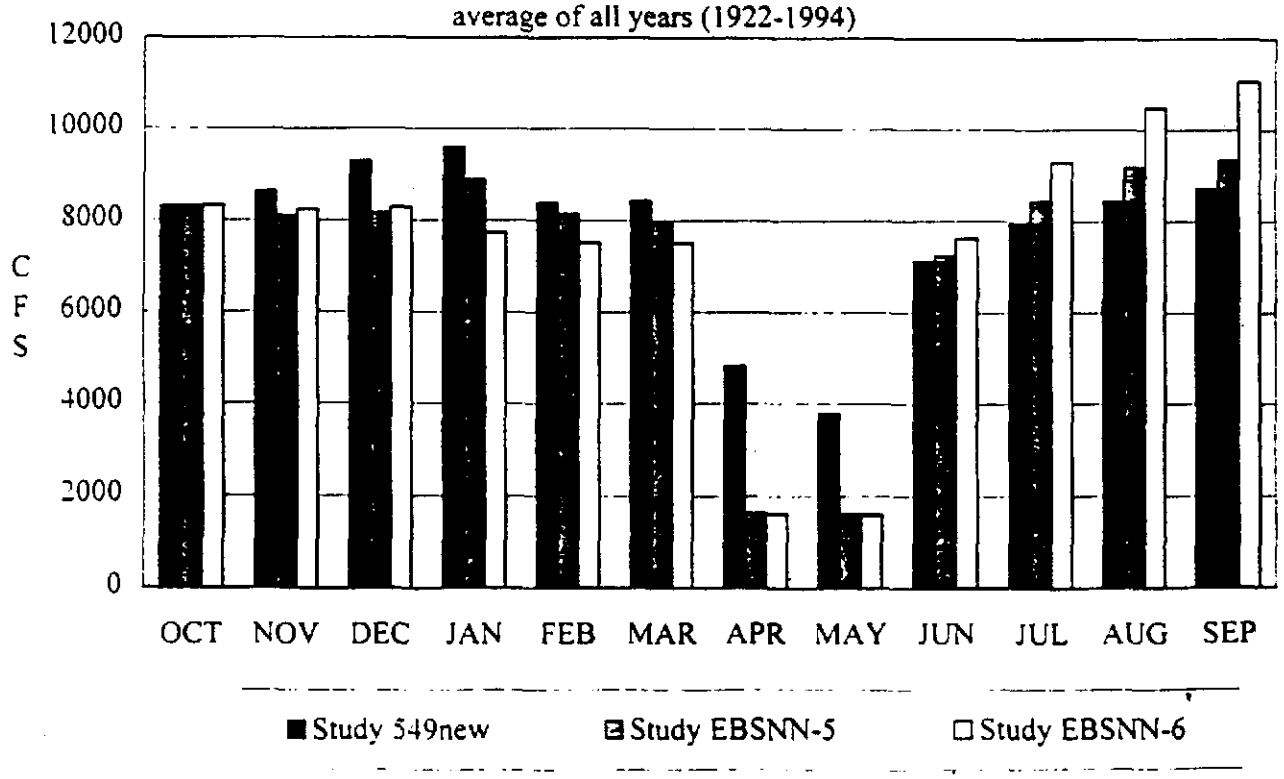


Figure A1-2
San Joaquin River at Vernalis
April-May Average Flow by Year Type

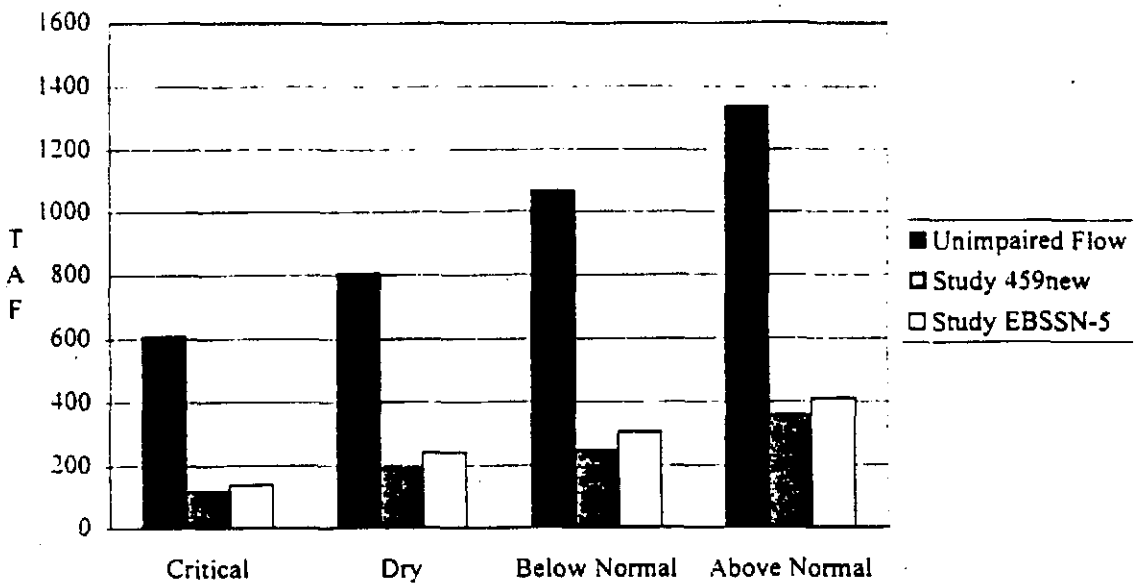


Figure A1-3
San Joaquin Tributary Reservoirs
Projected Carryover Storage

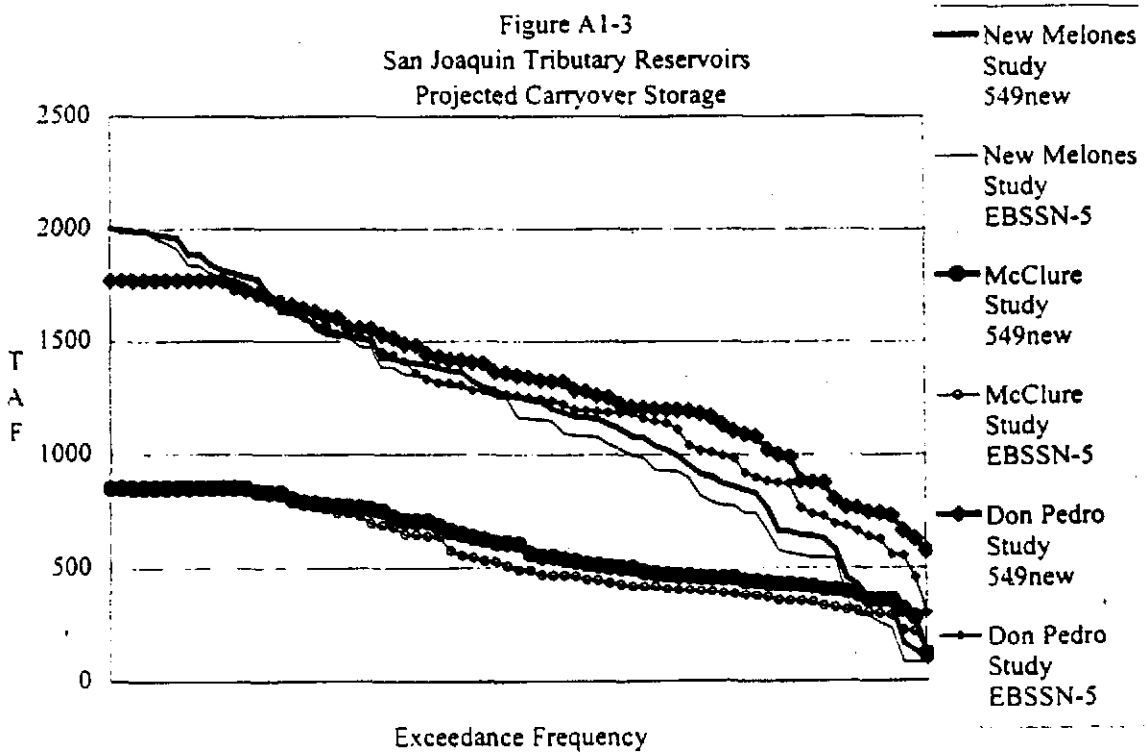


Figure A1-4
December Delta Exports

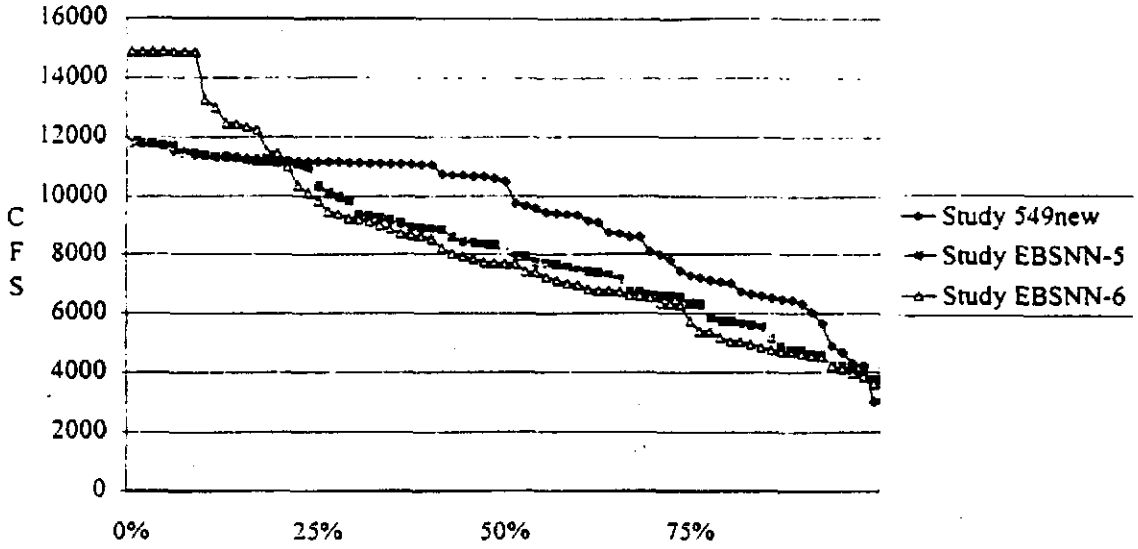


Figure A1-5
December Export-Inflow Ratio

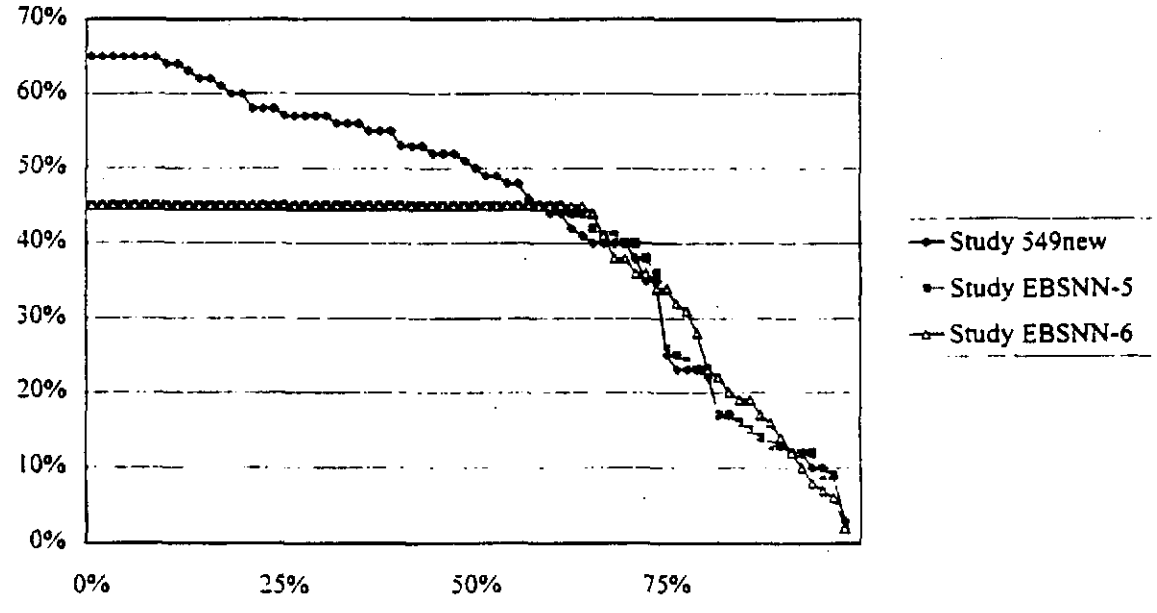


Figure A1-6
September Delta Exports

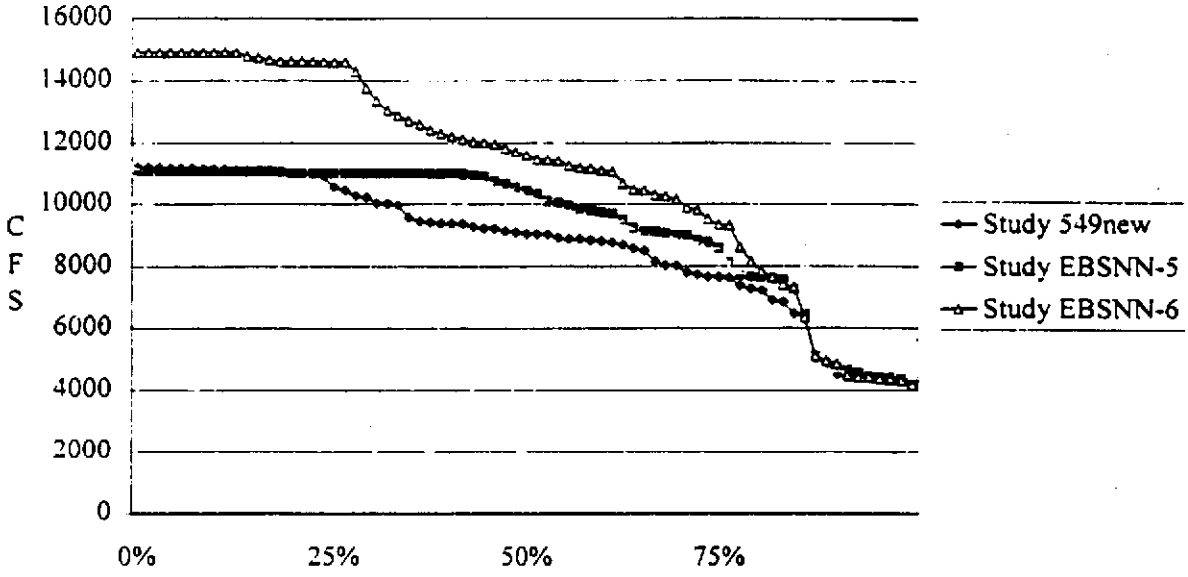


Figure A1-7
September Export-Inflow Ratio

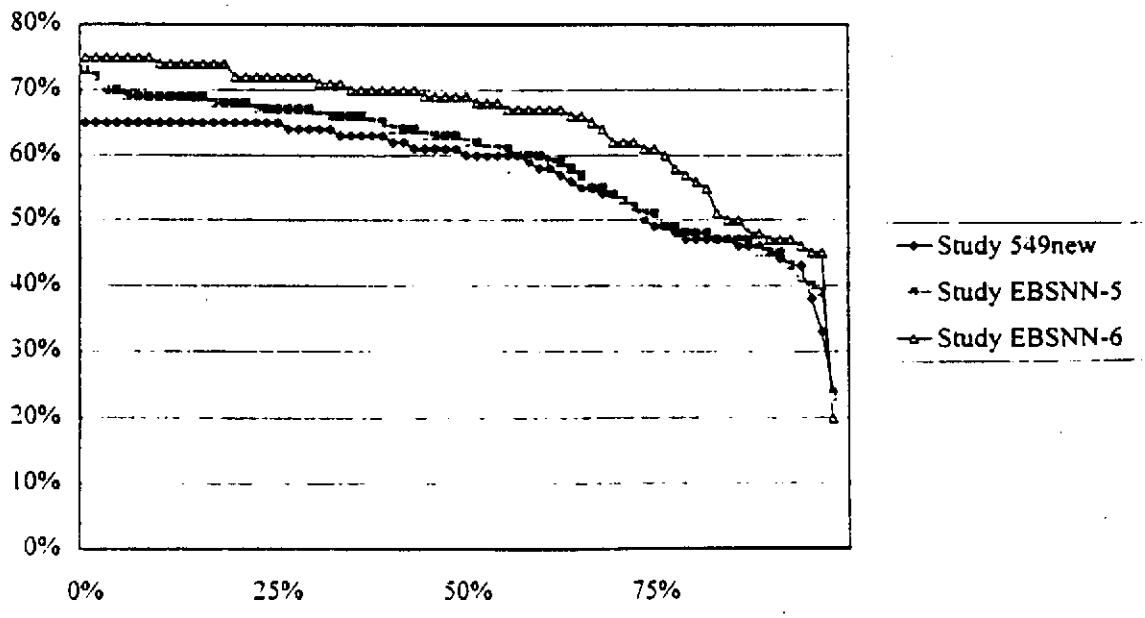


Figure A1-8
Critical Year Average X2 Position

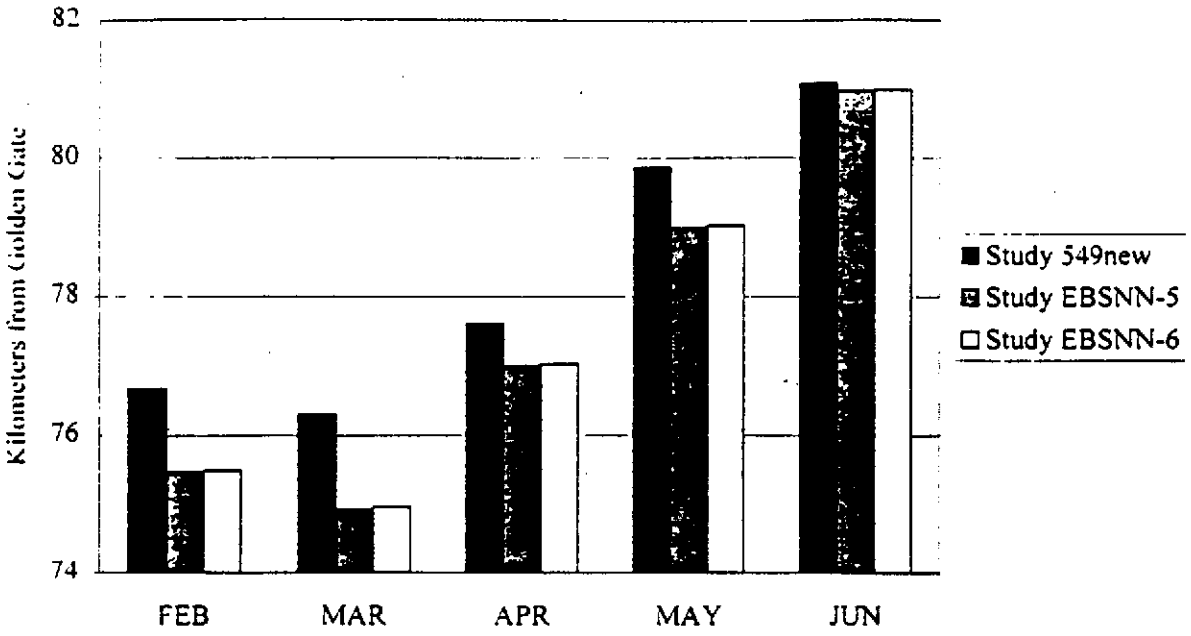
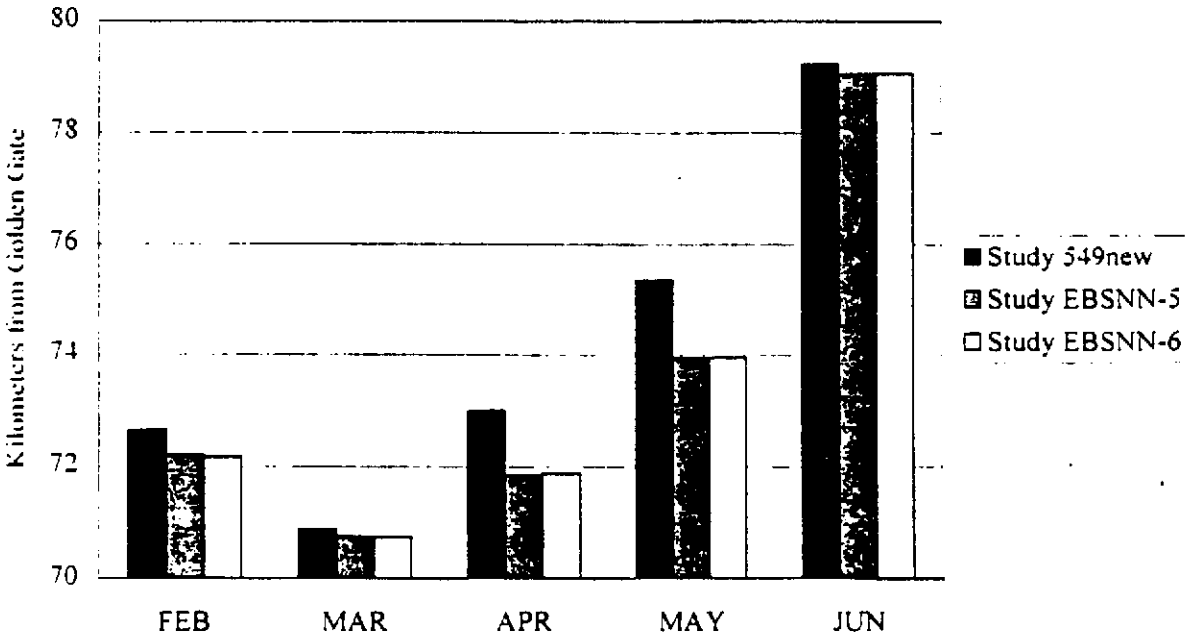


Figure A1-9
Dry Year Average X2 Position



APPENDIX B

ENVIRONMENTAL
DEFENSE FUND

California Office
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(510) 658-8008
Fax: 510-658-0630
www.edf.org

September 14, 1999

Hon. Lester Snow, Director
CALFED Bay-Delta Program
1416 Ninth Street, Room 1155
Sacramento, CA 95814

Re: Environmental Water Account

Dear Lester:

As you know, the Environmental Defense Fund has closely followed the discussions and "gaming" exercises associated with CALFED's efforts to develop an "Environmental Water Account" (EWA) over the past year. We believe that the fundamental component of such an account -- the ability to manage water flexibly under real-time biologic and hydrologic conditions -- has considerable merit, and could be effectively used in place of at least some prescriptive standards. We are concerned, however, with several aspects of CALFED's current effort to develop the EWA. Without significant digression into EDF's legal views and policy preferences, we offer the following initial suggestions.

Clearly distinguish environmental objectives from consumptive water supply and drinking water quality objectives. The EWA gaming exercises have muddled these three components and rendered it impossible to evaluate the environmental benefits of substituting or complementing certain prescriptive standards with flexible operations. In addition, evaluating operational changes to increase water supply and improve water quality under the pretext of an "Environmental Water Account" is confusing at best, and will make it very difficult for the public to understand, and therefore support, any CALFED proposal for an EWA. It is certainly appropriate to evaluate environmental, water supply and water quality objectives together, as components of CALFED's *Water Management Strategy*, but CALFED should not be using the term "Environmental" with respect to any proposed increases in overall Delta exports.

Determine appropriate "baseline" criteria for measurement of the EWA. It will not be possible to account for environmental water until appropriate baseline conditions are determined. This baseline should reflect current export levels under a broad variety of existing legal and regulatory requirements, including operating parameters, financial obligations, and Endangered Species Act requirements. (In addition, it will not be possible to implement CALFED's "Beneficiary Pays" principle, unless benefits can first be measured. Benefits, in turn, cannot be measured until CALFED clearly defines the baseline.)

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Clarify the role of b2 water. The CVPIA's annual dedication of 800,000 acre-feet of CVP yield to fishery restoration purposes has been the subject of significant dispute among CALFED's agencies and stakeholders. A ruling from the U.S. District Court should be forthcoming in the near future, and will hopefully provide clear guidelines under which the operations dedicating b2 water to the environment can be implemented. It is our hope that CALFED agencies and stakeholders alike will be able to move forward in accordance with the court's interpretation of the law. If and when such a ruling does occur, CALFED should work with the Department of the Interior to clarify how the b2 water and EWA water can be used cooperatively for the maximum benefit of fisheries in the Delta and upstream.

Let stakeholders determine their own representation. CALFED recently distributed a draft "EWA Development Team: *Management Structure*", which includes a list of agencies, organizations, and individuals who would be members of an EWA Development Team. We do not believe that it is in the public interest for CALFED to pre-select the stakeholders who would comprise such a committee, but that the stakeholders themselves should determine how they are best represented.

Thank you for considering these views. EDF is prepared to engage constructively with CALFED to develop an Environmental Water Account, and we believe that adherence to these principles will put CALFED in a position to proceed effectively.

Sincerely,

Spreck Rosekrans
Senior Analyst

Cc: CALFED Policy Group
Ron Ott, EWA Project Manager

APPENDIX C

APPENDIX D

EEWMA Table 8.1 Reconstruction[1]:

Analysis of Annual "New" Supply Costs[2] and Isolated Facility Cost Internalization

Analysis of Angela Sherry, Environmental Defense Fund

		Preference Stakeholders																	
		Delta Agriculture			**Environmental**			**San Joaquin Valley**			**Sacramento Valley**			**Urban Delta Exporters**			**Urban In-Delta Diverters**		
Regions (Totals in million $; Average and marginal in $/AF)	Unconstrained	Delta Agriculture Costs	Absolute Difference	% Difference	Environmental Costs	Absolute Difference	% Difference	San Joaquin Valley Costs	Absolute Difference	% Difference	Sacramento Valley Costs	Absolute Difference	% Difference	Urban Delta Exporters Costs	Absolute Difference	% Difference	Urban In-Delta Diverters Costs	Absolute Difference	% Difference
	[1]	[2]	[3] [2] - [1]	[4] [3]/[1]	[5]	[6] [5] - [1]	[7] [6]/[1]	[8]	[9] [8] - [1]	[10] [9]/[1]	[11]	[12] [11] - [1]	[13] [12]/[1]	[14]	[15] [14] - [1]	[16] [15]/[1]	[17]	[18] [17] - [1]	[19] [18]/[1]
Southcoast																			
Total Dry-year Cost	1820	2075	255	14.01%	1950	130	7.14%	1713	-107	-5.88%	1906	86	4.73%	1661	-159	-8.74%	1820	0	0.00%
Average Supply Cost	792	837	45	5.68%	815	23	2.90%	750	-42	-5.30%	807	15	1.89%	732	-60	-7.58%	792	0	0.00%
Marginal New Supply Cost	1057	1609	552	52.22%	1151	94	8.89%	1151	94	8.89%	1265	208	19.68%	1151	94	8.89%	1057	0	0.00%
San Francisco Bay																			
Total Dry-year Cost	201	207	6	2.99%	203	2	1.00%	171	-30	-14.93%	202	1	0.50%	174	-27	-13.43%	201	0	0.00%
Average Supply Cost	820	825	5	0.61%	822	2	0.24%	769	-51	-6.22%	821	1	0.12%	761	-59	-7.20%	820	0	0.00%
Marginal New Supply Cost	1124	1332	208	18.51%	1162	38	3.38%	962	-162	-14.41%	1124	0	0.00%	906	-218	-19.40%	1124	0	0.00%
Sacramento River																			
Total Dry-year Cost	0	0	N/A	N/A	0	N/A	N/A	44	44	N/A	61	61	N/A	0	0	N/A	0	0	N/A
Average Supply Cost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	170	N/A	N/A	260	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Marginal New Supply Cost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1240	N/A	N/A	1240	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
San Joaquin River																			
Total Dry-year Cost	2	7	5	250.00%	1	-1	-50.00%	93	91	4550.00%	61	59	2950.00%	2	0	0.00%	2	0	0.00%
Average Supply Cost	125	125	0	0.00%	125	0	0.00%	525	400	320.00%	365	240	192.00%	125	0	0.00%	125	0	0.00%
Marginal New Supply Cost	130	130	0	0.00%	130	0	0.00%	1300	1170	900.00%	1300	1170	900.00%	130	0	0.00%	130	0	0.00%
Tulare Lake																			
Total Dry-year Cost	52	52	0	0.00%	28	-24	-46.15%	320	268	515.38%	317	265	509.62%	52	0	0.00%	52	0	0.00%
Average Supply Cost	130	130	0	0.00%	130	0	0.00%	335	205	157.69%	340	210	161.54%	130	0	0.00%	130	0	0.00%
Marginal New Supply Cost	210	210	0	0.00%	210	0	0.00%	1260	1050	500.00%	1260	1050	500.00%	210	0	0.00%	210	0	0.00%
All Five Regions																			
Overall Total Dry-year Costs	2075	2341	266	12.82%	2182	107	5.16%	2341	266	12.82%	2547	472	22.75%	1889	-186	-8.95%	2075	0	0.00%
Cost of Isolated Facility[3]														26					
Overall Total Dry-year Costs Including Cost of Isolated Facility	**2075**	**2341**	**266**	**12.82%**	**2182**	**107**	**5.16%**	**2341**	**266**	**12.82%**	**2547**	**472**	**22.75%**	**1915**	**-160**	**-7.71%**[4]	**2075**	**0**	**0.00%**

Footnotes:

1. Note that the costs in the EEWMA report do not yet include any of the subsidies imbedded in the scenarios: agricultural price supports, 75% of the isolated facility for Urban Delta Exporters, and matching active conjunctive use yields for the Environmental scenario.

2. Total dry-year cost for Urban Delta Exporters in the Southcoast region reflect the number given in Table 8.1 even though the corresponding text in Section 7.4.2 indicates a different amount.
   Roger Mann of Resource Management and Economics confirmed that there is a typo in Section 7.4.2 of the report, which states that there is a $159m "increase" over the unconstrained scenario. The report should have stated that there is a $159 "decrease"
   Also note that Roger Mann suspected a typo in Table 8.1, which presents Total Dry-year cost for the Urban In-Delta Diverters as $195m. Table 8.1 should have shown a value of $201m.

3. Costs in Table 8.1 of the EEWMA draft do not include the isolated facility costs of the Urban Delta Exporters, who specify that 75% of the costs are paid with subsidies: 25% by the Urban Delta Exporters.
   The report uses a $104m estimate of the annual cost of an isolated facility, as explained on p. 8-9. $104m calculated as an average of estimated annual costs of a 5,000- and 15,000-cfs facility at $82.6m and $124.9m, respectively. 25% of $104m is $26m.

4. The Urban Delta Exporters scenario is "cheaper" than the Unconstrained scenario because the Urban Delta Exporters include the isolated facility and the Unconstrained scenario uses "membrance technologies"
   The EEWMA calculates water treatments costs with the isolated facility as lower than with "membrane technologies"

APPENDIX E

The California State Water Project (SWP): A Preliminary Investigation of Financing and Subsidies

Draft, August 1998

Christopher LaFranchi

1. Introduction

Methods used to finance SWP infrastructure have and continue to partially determine the scope and magnitude of such developments and concomitant environmental impacts. Financing methods influence the way costs are recovered and water prices, both of which act to affect the demand for water and the infrastructure developed to supply it[1]. Contracting principals -- dictated by financing methods -- determine which costs are accounted for and how they are allocated. Water prices and cost allocation structure send signals to reduce or enlarge the size and number of developments. Consequently, finance has influenced the way water infrastructure development has changed California's landscape and ecosystems.

This working paper focuses on two aspects of SWP financing that may have influenced the above-cited developments: methods used to account for project costs; and, the way taxpayers helped fund such projects, especially when subsidies were involved.

Overall, this work is part of an on-going effort to establish a clearer picture of the true costs of supplying water to California, who has paid how much thus far into the full development scheme, and benefits received. It focuses on three objectives: 1.) summarizing and describing SWP capital/operating finance; 2.) describing how contracting principals and legal mechanisms put into place at the onset of the project established cost allocation, influenced water prices, and did not require consideration of at least some project outcomes that have significantly transformed California's landscape; and 3.) estimating possible financial subsidies associated with the project.

In terms of the CALFED process, it supports discussion of the "benefits-based approach" that plays a role in the program's effort to develop an equitable and comprehensive solution.

2. The Financial Status of the SWP

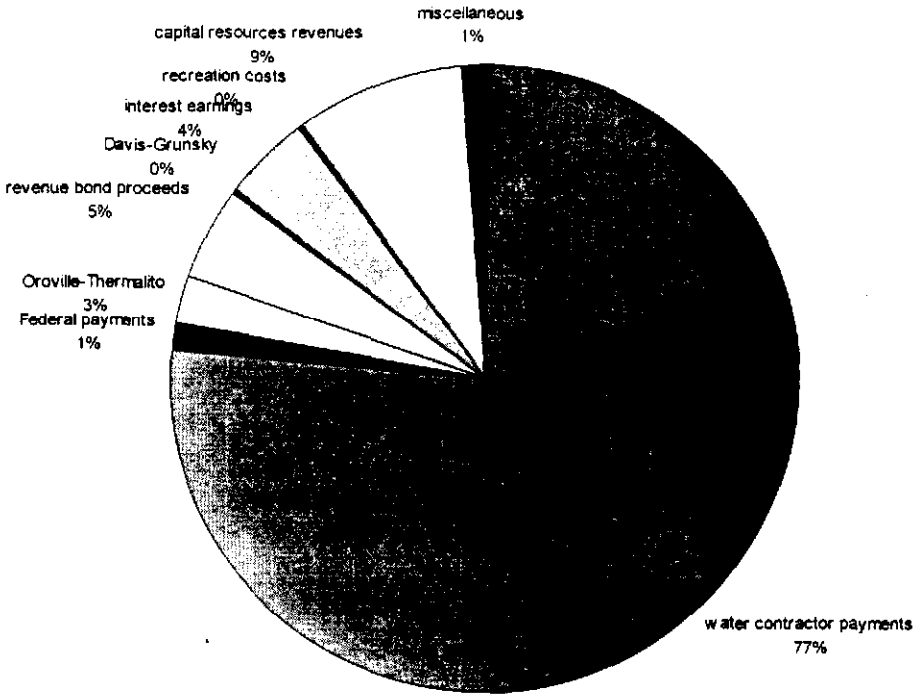
Following is a profile of SWP financing derived primarily from O'Connor (1994) and the State of California Department of Water Resources (DWR, 1997) -- Bulletin 132-96.

[1] Several related issues are listed in Appendix C.

As of 1996, the DWR has financed almost $9 billion in SWP operating expenses. Two pie charts and attached text illustrate breakdowns of expenses and project revenues.

Figure 3

SWP Water Project Revenues -- 1952-1996 (about 9.235 billion)



(source: Bulletin 132-96, Table 15-2)

DEFINITIONS --

capital resource revenues: includes federal payments for SWP capital, appropriations to recreation, payments from LA Dept. of W&P for Castaic Power development, advances from water contractors, appropriations prior to the Burns-Porter Act, and investment earnings (capital resources account, unexpected revenue bond proceeds) -- more information on p. 242 of the bulletin

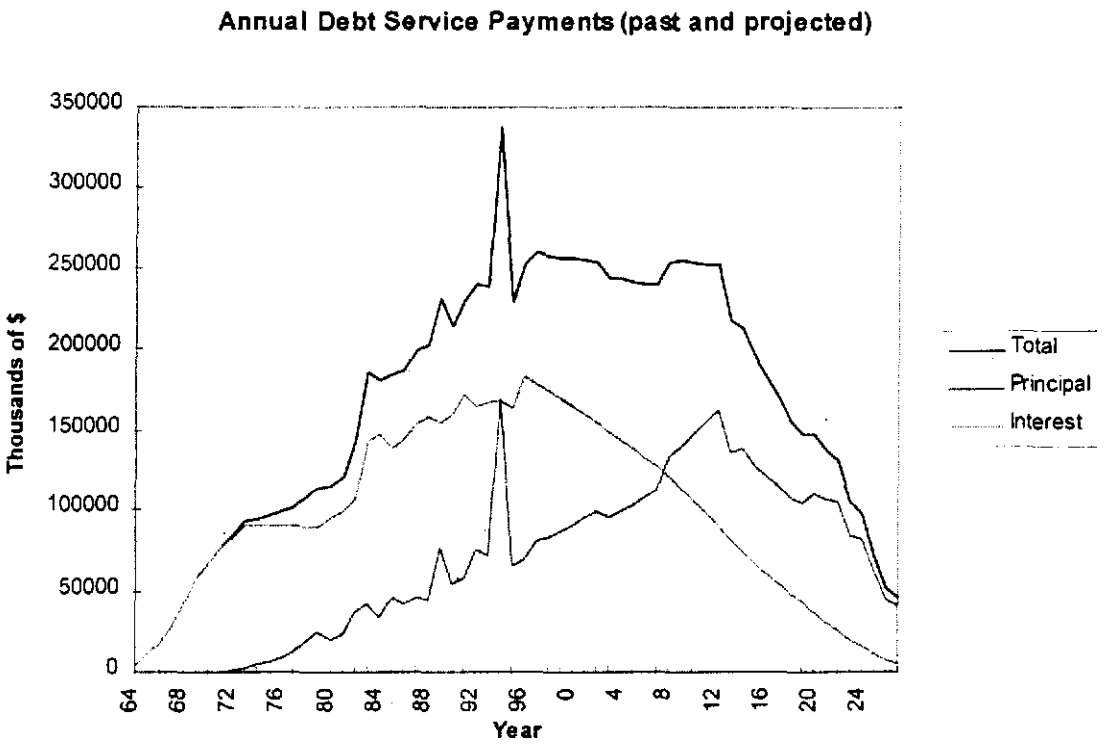
federal payments for project operating costs: payments made according to agreement (1961) between California and the United States providing for DWR to operate and maintain the San Luis Joint-Use Facilities -- more information on p. 245 of the bulletin

(continued on next page)

(source: Bulletin 132-96, Table 15-2)

Figure 4 below is a profile of the planned debt service repayment schedule associated with bonds issued to finance *reimbursable* costs (see the next section for a description of *reimbursable* and *nonreimbursable* costs). The primary source for this profile is Table 15-11 of Bulletin 132-96. Planned debt service is forecasted to occur over a 65 year time horizon (1964 to 2029) -- 1996 is year 33 of this period. At the end of that period, total principal and interest payments (bond-financing only) will amount to about $4.4 and $6.3 billion, respectively (about $10.7 billion total). In 1996, about $1.1 billion of principal and $3.5 billion in interest had been paid (about 4.6 billion total).

Figure 4



3. SWP Contracting Principals and Cost Allocation

The former Governor E. Brown's contracting principals, described in chapter 2 of O'Connor (1994), established the financing framework for the SWP in 1960. They determined several elements of water development including:

- the terms for repayment of capital costs;
- which costs are accounted for and how such costs are derived;
- how costs are separated into *reimbursable* and *nonreimbursable*;
- methods used to allocate costs among project beneficiaries (also known as project purposes); and

Allocating the "cost" of environmental impacts

In the process of allocating costs to beneficiaries, the DWR chose to recognize some project results (by attaching costs/benefits to them) and assume away others. For example, the DWR appropriated capital/operating costs to recreation (a *nonreimbursable* cost paid for with public funds), acknowledging the recreational benefits created as a result water infrastructure development.

Environmental effects or "costs" of water facility construction were not allocated by the DWR to direct beneficiaries of the project -- at the project inception or thereafter. The following quote from O'Connor (p. 24) illustrates how these costs were assumed away when the project was conceived:

> *"It is important to note, however, that the DWR separates the costs* ***after*** *it has made the decision to build the particular facility. That is, the DWR does not consider the environmental effects of building the facility when allocating costs among purposes. Take, for example, when the DWR allocated costs for Oroville Dam. The DWR's calculations on the benefits to fish and wildlife did not take into consideration the fact that building the dam would have an effect on the then existing environment. Nor did anything require them to. However, if the DWR had netted the effect on fish and wildlife of building the dam with the benefits, the DWR would likely allocate less costs to fish and wildlife."*

Such project results are, in part, irreparable and involve costs that could be incurred indefinitely. As part of the CALFED process, public funds are now being allocated to address the environmental effects from SWP development.

Although these effects were not accounted for at the project inception, there are actions and expenditures which serve to implicitly account for impacts and costs associated with them:

1.) It is now necessary to allocate resources to attributes of the environment that, prior to SWP development, did not require such allocations;

2.) Public/private funds are used to pay the cost of allocating such resources to attributes of the environment; and

3.) Public/private funds are being used to mitigate the environmental costs resulting from initial SWP development costs that were assumed away, and for environmental costs associated with normal SWP operation.

There are two identified ways in which direct beneficiaries (water contractors) are paying to prevent/mitigate environmental costs: 1.) by paying some portion of costs associated with changes in engineering and operational controls designed to avoid damage to the

General Obligation Bonds

GO bonds are tax exempt and backed by the full faith and credit of the federal government. As such they reflect interest rates that were consistently lower than market rates.

About 75% of SWP capital costs (about $4.4 billion) are financed using these bonds. The anticipated repayment schedule is over 65 years, according to Bulletin 132-96 (the repayment schedule for each bond series varies from about 25 years to about 60 years). Even a small bond point spread produces a substantially different interest payment because it involves a large sum financed over 65 years.

Table 15-11 of the bulletin displays annual debt served on bonds sold through June of 1996. Under "Grand Total" it indicates that a principal of about 4.4 billion will be paid back by 2029 with an interest payment totaling about 6.3 billion. Table 15-9 presents bond sales and project interest rates, by date of sale. A project interest rate of about 4.6 percent is defined as an amount determined by dividing cumulative interest costs by cumulative dollar-years and expressed as a percentage.

To estimate the subsidy, a repayment schedule was recreated using the annual debt service schedule on bonds from Table 15-11 of the Bulletin (see Appendix B). Using the schedule for bond sales, annual principal remaining was derived for the 65-year repayment period. Hypothetical market interest rates of 6 and 8 percent were then applied to the debt service schedule. Total interest payments for hypothetical rates were calculated and are compared to the total interest payment for the SWP.

TABLE 3
Estimate of Financial Subsidy Associated with Issuance of General Obligation Bonds*

	4.6% (project interest rate)	6%	8%
total interest payment	$6.11 billion	$7.94 billion	$10.58 billion
difference between government sponsored bonds and hypothetical market interest rate	--	$1.83 billion	$4.47 billion

*based on a principal remaining schedule that is in turn based on the past and projected repayment schedule for bonds issued between 1964 and 1996

"Other" Sources

Moreover, "other" sources of capital funds (O'Connor, 1994) account for about 15% of the total source of capital funds. In this case the "other" is: Davis-Grunsky Act Bonds, Federal payments for capital expenditures, and appropriations for capital costs allocated to recreation. Therefore, capital costs of the SWP (about 5.1 billion) were offset by as much as 25% by these "other" sources and the CWF-- all for a cost to water users of about 176 million, as of 1994.

With reference to the "other" sources, federal payments and appropriations are public funds not subject to repayment. The Davis Grunsky Act monies, although subject to repayment, contain inherent subsidies. The act consists of 130 million reserved from the 1.75 billion made available through the Burns-Porter Act (monies are paid from the California Water Resources Development Fund and the CWF -- breakdown unknown). Loans were made at the current interest rate, prior to 1967, and fixed by the legislature at 2.5% thereafter. The maximum repayment period was set at 50 years; however, initial 10 year deferments -- with the accumulated interest amortized over the repayment period -- were granted to some agencies. A quantitative estimate of this potential public subsidy was not made.

References

O'Connor, Dennis. CRB Issue Summary: Financing the State Water Project. California Research Bureau, California State Library, CRP-IS-94-004. June 1994.

State of California Department of Water Resources. Management of the California State Water Project, Bulletin 132-97. August 1997.

APPENDIX B

Bond Debt Service Schedule

thousands of $

Year	Total	Principal	Interest	P remain.	I remain.	ACTUAL 4.62% I accum.	HYPO. 1 6% I accum.	HYPO. 2 8% I accum.
64	3333	0	3333	1582400	6338365	73122.7	94944	126592
65	11114	0	11114	1582400	6335032	73122.7	94944	126592
66	16742	0	16742	1582400	6323918	73122.7	94944	126592
67	26912	0	26912	1582400	6307176	73122.7	94944	126592
68	41636	0	41636	1827395	6280264	84443.92	109643.7	146191.6
69	57909	0	57909	1827395	6238628	84443.92	109643.7	146191.6
70	66436	0	66436	1827395	6180719	84443.92	109643.7	146191.6
71	76180	0	76180	1827395	6114283	84443.92	109643.7	146191.6
72	83520	1260	82260	1826135	6038103	84385.7	109568.1	146090.8
73	92628	2530	90098	1962770	5955843	90699.6	117766.2	157021.6
74	94610	4400	90210	1958370	5865745	90496.28	117502.2	156669.6
75	96442	6475	89967	1951895	5775535	90197.07	117113.7	156151.6
76	98482	8555	89927	1943340	5685568	89801.74	116600.4	155467.2
77	101593	11835	89758	1931505	5595641	89254.85	115890.3	154520.4
78	108032	18475	89557	1913030	5505883	88401.12	114781.8	153042.4
79	113908	25235	88673	1887795	5416326	87235.01	113267.7	151023.6
80	114630	19315	95315	1974990	5327653	91264.29	118499.4	157999.2
81	121800	22935	98865	1952055	5232338	90204.46	117123.3	156164.4
82	143647	37170	106477	2338702	5133473	108071.4	140322.1	187096.2
83	185514	42530	142984	2633830	5026996	121709.3	158029.8	210706.4
84	181011	33385	147626	2600445	4884012	120166.6	156026.7	208035.6
85	184842	46365	138477	2554080	4736386	118024	153244.8	204326.4
86	187122	42095	145027	2949902	4597909	136315	176994.1	235992.2
87	198724	45565	153159	3986893	4452882	184234.3	239213.6	318951.4
88	202737	44855	157882	3942038	4299723	182161.6	236522.3	315363
89	231885	76981	154904	3865057	4141841	178604.3	231903.4	309204.6
90	213587	54255	159332	3810802	3986937	176097.2	228648.1	304864.2
91	230206	58705	171501	3752097	3827605	173384.4	225125.8	300167.8
92	240256	75165	165091	3676932	3656104	169911	220615.9	294154.6
93	239212	72080	167132	3604852	3491013	166580.2	216291.1	288388.2
94	337432	169191	168241	3435661	3323881	158761.9	206139.7	274852.9
95	228186	65139	163047	3370522	3155640	155751.8	202231.3	269641.8
96	**252196**	**69270**	**182926**	**3333252**	**2992593**	**154029.6**	**199995.1**	**266660.2**

(Continued on next page)

APPENDIX C

The following issues are relevant to finance principals, although they may not be directly addressed in this paper:

- there is a relatively great geographical variation in the way water is distributed and priced in California;
- as state-wide water demand increases, supply is contracting;
- development of some proposed water infrastructure may not be viable without use of public funds;
- water shortage in the state is exacerbated when the demand for water grows and the price does not reflect the true costs of extraction, impoundment, and conveyance (researchers at the University of California at Davis are currently estimating the shadow price of water);
- when water itself is not priced, or when the cost of water does not represent the cost of extraction, impoundment, and conveyance, price signals that would exist when supplies are becoming depleted do not act to curtail demand;
- water entitlements that prevent direct competition for a scarce resource inhibit the most efficient use of already developed supplies (e.g., if entitlements were stripped and all interests competed on a level playing field for available supplies, the prices paid by some water agencies with entitlements would be much higher).

APPENDIX F

BARBARA BOXER
CALIFORNIA

COMMITTEES:
BUDGET
ENVIRONMENT AND PUBLIC WORKS
FOREIGN RELATIONS

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August 24, 1999

Lester Snow, Executive Director
CALFED
1416 9th, #1155
Sacramento, CA 95814

Dear Mr. Snow:

I am writing to ask you for clarification with respect to a serious matter that has recently been brought to my attention.

As you know, I have long been an active supporter of the Central Valley Project Improvement Act, the Bay-Delta Accord, and the whole CALFED effort to develop a forward-looking, multi-objective and comprehensive plan for California's water future. I have repeatedly called for all parties to "stay at the table" and continue to work toward a mutually agreeable solution. I also have opposed particular projects, such as Auburn Dam and the Peripheral Canal, both of which I believe to be unnecessary, polarizing and environmentally damaging.

It has been my impression that CALFED was in basic agreement with these views. Auburn Dam has been explicitly excluded from consideration as a surface storage project by CALFED. And, in the December 18, 1998 Revised Phase II Report CALFED had set out a seven-year planning process which explicitly deferred any decision on a Peripheral Canal until a carefully devised study program, assessing water quality, fishery improvement and other factors, had been completed. The media has widely reported that consideration of a Peripheral Canal is terminated for now, and you have been quoted as saying it is not part of the preferred alternative.

The recent June 1999 Revised Phase II Report, however, states that, subject to certain conditions, "a pilot screened diversion [of significant size and which I am told is on the alignment of the Peripheral Canal] would be constructed" and that its operations would then be evaluated in years five to seven of the CALFED Program.

Could you please clarify for me whether CALFED intended to change its position on the Peripheral Canal and Delta conveyance between December and June? If no change was intended, please so state and indicate that the December 1998 agreement with respect

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FRESNO, CA 93721
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600 "B" STREET
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SAN DIEGO, CA 92101
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SUITE 210
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(909) 888-8525

to the Peripheral Canal is still operative. If there has been a change, please inform me what the basis is for that change and describe the ways in which the relevant stakeholders were informed and consulted about this change.

Thank you for your prompt response to this inquiry. As you know, comments on the pending EIS/EIR are due in late September and hearings are underway on the plan. It would help all involved to know what CALFED's views are on this matter as soon as possible. Please direct your response to my San Francisco office, ATTN: Sam Chapman.

Sincerely,

Barbara Boxer
United States Senator

cc: Regional Administrator Felicia Marcus, EPA
Interior Secretary Bruce Babbitt
California Resources Secretary Mary Nichols

DON YOUNG, CHAIRMAN

U.S. House of Representatives
Committee on Resources
Washington, DC 20515

August 26, 1999

Mr. Lester Snow
Executive Director
CALFED Bay-Delta Program
1416 Ninth Street, Suite 1155
Sacramento, CA 95814

Dear Lester:

I know that you are aware of the recent press reports that the CALFED documents released on June 25, 1999 indicate that CALFED is strongly considering policies that may lead to construction of a significant conveyance facility between Hood and the Mokelumne River, beginning perhaps as early as year 5 of Stage 1. Specifically, the "Preferred Program Alternative" discussion on page 109 of the "Revised Phase II Report" identifies "a screened diversion of up to 4000 cfs" as a component of the Conveyance Program. This project is referred to in several other locations in the CALFED documents as a diversion at Hood or a "pilot screened diversion" (PSD).

I understand that no final decisions have been made, no funds have been committed, and that many conditions and findings would have to precede construction of such a facility. However, the financial, environmental, and political implications of building such a large canal in this area of the Delta are substantial and troubling.

Obviously, the comparisons of the PSD to the first reach of a Peripheral Canal (of any size) are inevitable if for no other reason than the proposed canal alignments are quite similar. If CALFED is proposing construction of *any* new diversions and conveyances from the Sacramento River, of whatever size, I want to be sure I have a clear understanding of exactly what projects are on the table, and why CALFED planners believe construction might be justified. As exemplified by the proposed 4,000 cfs pilot screened diversion, it appears decisions on conveyance projects are being driven primarily by the desire of CALFED planners to satisfy drinking water agency demands for increased supplies, including substantial amounts of Sacramento River fresh water.

This letter identifies significant issues affecting CALFED's decision to include the 4,000 cfs "pilot screened diversion" (page130, Revised Phase II Report, June, 1999) as part of the "Preferred Program Alternative". I have referenced the CALFED documents to indicate how it is possible to conclude that CALFED policies appear to many to virtually presume the construction of a large water diversion and conveyance facility on the Sacramento River near Hood, and perhaps even to the Peripheral Canal.

I request your written response to these concerns no later than September 15, 1999.

1.8 ***If there is any significant difference between the endpoint and/or alignment of the 4,000 cfs Hood diversion and the endpoint and/or alignment of the first segment of the Isolated Conveyance Facility, describe those differences in detail and provide maps which specifically depict those differences.***

1.9 ***Please describe specifically the sources for all monies CALFED intends using to evaluate, plan, and construct the 4,000 cfs Hood diversion, including fish screen and, if applicable, pumps, and state the dollar amount anticipated from each source and the fiscal year of each expected receipt and expenditure.***

1.10 ***Describe the specific measurement process CALFED intends to use to determine whether or not there has been "fisheries recovery" within the meaning of the Isolated Facility Component section on page 131 of the 6/99 Revised Phase II Report and identify the document and page where this methodology appears in the EIS/EIR.***

2. The 4,000 cfs pilot conveyance facility was not identified as part of the Draft Implementation Plan and Revised Phase II Report dated December 18, 1998. That document contemplates a facility half the size of the June, 1999 project, and it is shown as an evaluation, *not* as a construction project for Stage 1:

> *"9. Evaluate whether a 2,000 cfs screened diversion from the Sacramento River at Hood to the Mokelumne River can be constructed to improve or maintain central Delta water quality, without compromising fish protection achieved by operation of the Delta Cross Channel or creating other adverse fishery impacts." (pages 110-111, Revised Phase II Report, December 18, 1998).*

2.1 ***Who made the decision between December 18, 1998 and June, 1999 to double the size of this facility? How was it decided that the project "would be constructed" beginning perhaps as early as Year 5 of Stage 1, rather than simply "evaluated?"***

2.2 ***Was BDAC consulted regarding these decisions? Which stakeholder groups, including representatives of urban drinking water supply agencies, were consulted, and when were meetings or conversations conducted?***

3. Information provided to Congressional offices and staff following the release of the CALFED Draft Programmatic Environmental Impact Statement/Environmental Impact Report (June, 1999) failed to highlight the 4,000 cfs pilot screened diversion project. In fact, a document distributed to Congressional staff entitled "Recent CALFED Program Refinements", dated

5.4 *Are the Drinking Water Quality Targets for Parameters of Concern, which are listed in Appendix D of CALFED's 6/99 Water Quality Program Plan Report, the same as CALFED's drinking water quality goals referred to in paragraphs 2 and 3 of the North Delta Improvements section on page 130 of the 6/99 Revised Phase II Report? If not, set forth those drinking water quality goals, and identify the documents and pages where they are they listed in the EIS/EIR.*

5.5 *Describe the specific measurement process CALFED would use to determine whether or not it has made "adequate improvements toward CALFED's drinking water quality goals" within the meaning of paragraph 2 of the North Delta Improvements section on page 130 of the 6/99 Revised Phase II Report, and identify the document and page number where this methodology appears in the EIS/EIR.*

5.6 *Describe the specific measurement process CALFED would use to determine if its Water Quality Program measures "are consistently not achieving drinking water quality goals," within the meaning of paragraph 3 of the North Delta Improvements section on page 130 of the 6/99 Revised Phase II Report, and identify the document and page number where this methodology appears in the EIS/EIR.*

5.7 *State why in the Isolated Facility Component section on page 131 of the 6/99 Revised Phase II Report, constituent parameters are set forth for total organic carbon and bromide while neither parameter was previously stated in the parallel section of the December 18, 1998 Draft of the Revised Phase II Report. Explain the origin of these constituent parameters and how they were derived.*

5.8 *State whether or not the constituent parameters for total organic carbon and bromide which appear in the Isolated Facility Component section on page 131 of the Revised Phase II Report and are referred to in that section as "measurable water quality goals," are among the "drinking water quality goals," referred to in paragraphs 2 and 3 of the North Delta Improvements section on page 130 of the 6/99 Revised Phase II Report. If not, state CALFED's specific drinking water quality goals for total organic carbon and bromide, identify the document and page number of the EIS/EIR where they are set forth, and state the origin of these drinking water quality total organic carbon and bromide goals and how they were derived.*

6. CALFED's June, 1999 Water Quality Program Plan concludes (page 3-46) that it is unlikely that the bromide target can be met:

funds for this purpose, please explain how that position was arrived at. Has CALFED engaged in discussions with several urban water districts that reportedly are contemplating substantial efforts at expanded treatment as a feasible means for addressing water quality targets?

As is evident by this letter, the public concerns about the Pilot Screened Diversion exist on two serious levels. The emphasis on source water quality as a trigger for such a controversial project appears unrealistic given CALFED's own documentation that strongly suggests the impossibility of meeting its bromide goal. Therefore, the "option" of the PSD, or as some view it, a mini-Peripheral Canal, has the appearance of a foregone conclusion. Some understandably view such a construct as a cynical maneuver to guarantee failure and thus justify the isolated facility.

Secondly, there are the serious and justified concerns that the sudden appearance of such a volatile proposal late in the CALFED process, with little or no apparent consultation with deeply interested and affected interests in Washington and in California, does serious damage to CALFED's credibility and undermines its claim to be a stakeholder driven process.

I remain convinced that a strong CALFED program can serve as a workable and effective means for identifying options for the long term resolution of California's water quality and quantity issues, while retaining a full commitment to enforcement of existing state and federal laws. I look forward to your timely response to the questions raised herein which will help preserve the integrity of the CALFED process and explain how this controversy developed and how we can assure that it does not do severe damage to the future of CALFED.

Sincerely,

GEORGE MILLER
Senior Democrat

Copies to: Hon. Bruce Babbitt
Hon. Patricia Beneke
Hon. Mary Nichols
Hon. Tom Hannigan
Hon. Carol M. Browner
Felicia Marcus